September 1939

RADIO AND HOBBIES IN AUSTRALIA

VOL. 1, No. 6

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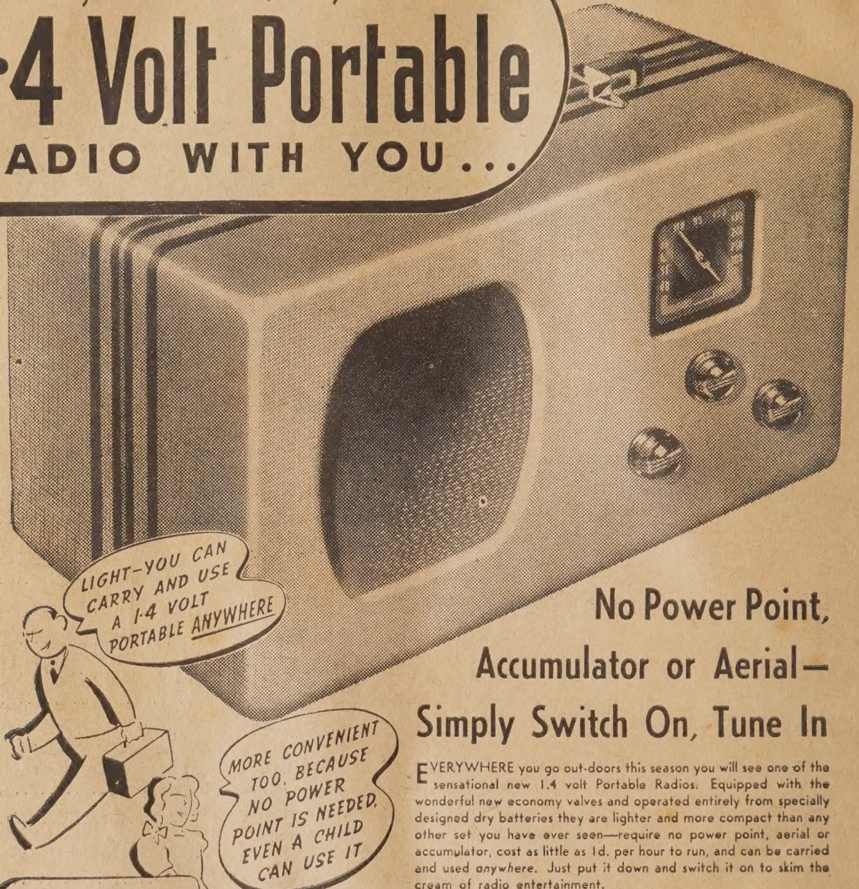
"WIRELESS WEEKLY" PUBLICATION

Touring or Tramping—TAKE A

1·4 Volt Portable

RADIO WITH YOU . . .


LIGHT—YOU CAN CARRY AND USE A 1·4 VOLT PORTABLE ANYWHERE
MORE CONVENIENT TOO, BECAUSE NO POWER POINT IS NEEDED, EVEN A CHILD CAN USE IT

No Power Point, Accumulator or Aerial— Simply Switch On, Tune In

EVERYWHERE you go out-doors this season you will see one of the sensational new 1.4 volt Portable Radios. Equipped with the wonderful new economy valves and operated entirely from specially designed dry batteries they are lighter and more compact than any other set you have ever seen—require no power point, aerial or accumulator, cost as little as 1d. per hour to run, and can be carried and used *anywhere*. Just put it down and switch it on to skim the cream of radio entertainment.

In the bush, at the seaside, even in the garden or as a "second" set around the house a 1.4 volt Portable radio offers you and your friends endless hours of fun and music, so see your nearest radio dealer to-day and ask him to show you one of the newest models—or write to Box 37, P.O. Mascot, for advance literature. Sent Free.

Shown above are the PR45 and PR8 Radio Batteries specially engineered to a size suitable for the modern Portable. Offering an exceptionally long working life they keep operating costs down to a minimum.

1.4 Volt Portable Radio is Equipped with

EVER READY

RADIO BATTERIES

P19A-947

With the Editors

OUR FIRST SIX MONTHS

This issue of "RADIO AND HOBBIES" completes the first six months of our existence. We have been so busy with the details of publication, that the fact almost passed unnoticed. But there it is, we have been going for a full half-year!

We have every reason to be satisfied with our activities over that period. We started out with a circulation many times greater than we had hoped, and many times greater than any other similar journal has ever achieved in Australia. This circulation has steadily grown with each issue. During that six months we have received many letters from those of you who have had occasion to write. Each of your letters has contained appreciative remarks concerning our efforts, and good wishes for the future.

Now its all very well to know that our paper is universally approved. That fact remains, of course, and it's nice to know it. But do you think you can make any suggestions which could improve it? It doesn't help a great deal to be told it's a good paper, unless at the same time, you are prepared to say how you think it could be made better. No one wants to stand still these days, and we are always on the look-out for ways to improve the standard of our paper. So when you write, even if it's only a few lines, let us know what you would like to see published, which at present, isn't there. Then, when changes are due to be made, no matter how small, we will have something to guide us.

MORE SETS BEING BUILT

There seems to be no doubt that since "RADIO AND HOBBIES" has been on the bookstalls, the building of receivers and radio gear has shown a marked increase, at least in Sydney, where we are able to note the results more easily. A trip round the various radio stores indicates beyond doubt that many people are building up the sets we have described. And our mail-bag tells us how they have been getting on with them. It is particularly gratifying to know that this is so, not only because we feel our efforts have been justified, but also because you have been sufficiently interested to build up sets with parts obtained from our advertisers. After all, no paper could exist without advertisers, who are prepared to support its activities.

To all who have contributed to our success, we offer our very sincere thanks. We look forward to the next six months with the very fullest confidence.

OUR NEXT ISSUE

At the moment, we have not decided definitely what will appear next month. It is almost certain, however, that we shall describe a simple straightforward A.C. receiver of five valves, for the broadcast band—one which will be particularly easy, and quite inexpensive as well. It will be a standard type of receiver which can be referred to whenever anyone asks us for such a set. In addition, we will try to present an A.C. version of the T.R.F. short-waver in this issue, and possibly, a simple, but new 5-metre superhet. Anyhow, here's hoping!

Again, thank you for your assistance and good wishes during our first six months. And don't forget to make at least one suggestion, when you write to us!

EDITOR:
A. G. HULL.

TECHNICAL
EDITOR:
JOHN MOYLE.

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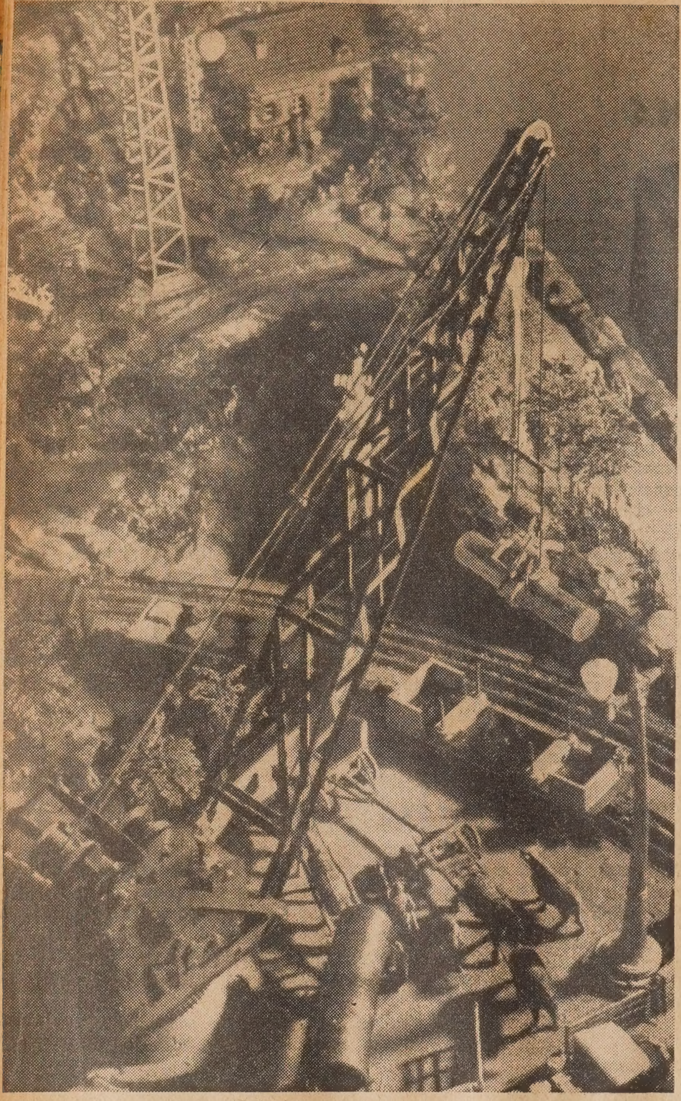
MARVELS

Miniature engineering is just what you make it. This is the story of a man who has carried it to a pitch undreamed of by the average hobbyist. Sir George Julius has not only made a collection of marvellous models, but he has used them to create a wonderland which appeals to man's age-old love of tiny things. Work of this nature combines a genius for engineering with the highest manual skill.



One of the cranes which can pick up practically anything in its steel jaws, and load it into the trucks waiting in the siding. Some of the animal models may be seen here. Note the bird standing on a rock in the centre of the picture.

AT the home of Sir George Julius, whose name is well-known to everyone connected or interested in engineering, there is a collection of models which, for their ingenuity, and perfection of detail, could scarcely be equalled anywhere else in the world.

More than 20 years has been spent collecting these models, and in building the huge super-structure which is their home.

For soon after he had commenced to make models for themselves alone, Sir George realised that, brought together in an ordered display, each would greatly add to the value of the other.

As a result, to-day there stands in his work-room, a veritable fairyland, representing the side of a rocky hill, the geology of which, as Sir George remarked in one of his frequent flashes of exquisite humor, has so far been denied to the knowledge of mankind.

For in this geographical wonderland are several mines in miniature, a whole and intricate system of railways, waterways, and roadways. It has strings of soldiers marching round its towering crags, and fascinating castles perched away against the skyline. It has railway gates which open and shut in perfect order, it has hundreds of tiny inhabitants who ride bicycles, drive motor-cars, hew rock, post letters, direct traffic, and just sit in the sun outside a rural cottage. Although these inhabitants do not actually move, nor for that matter, do the hundreds more of animals, birds, and beasts which live in this wonderful place, they serve to provide an atmosphere of fairy tale, which is in keeping with the incredible mechanical marvels which perform their multitudinous evolutions.

CHAOS OF COLOR

As a visitor to this wonderful place for the first time, I was simply dumbfounded at the first sight of the display.

The plaster imitation mountain-side is carried out in full colors, and stands out in relief, because of the special painting technique, which Sir George developed after the first 50 years (so it seemed) of work. Incidentally, there is a system of colored lights, which switch themselves on and off with little electric relays, hidden behind the caves and shelves of plaster rock. When these are lit, and all other lights extinguished, the effect is strikingly beautiful.

Winding in and out the superstructure, is a most complicated system of railways. These are all interlocked, and contain automatically operated points, controlled with signal lights, which operate in perfect synchronisation.

About a dozen complete sets of trains run on these lines, from passenger expresses to electric locomotives. Many of these are part of several major evolutions, of which the display is built up.

WHEELS WITHIN WHEELS

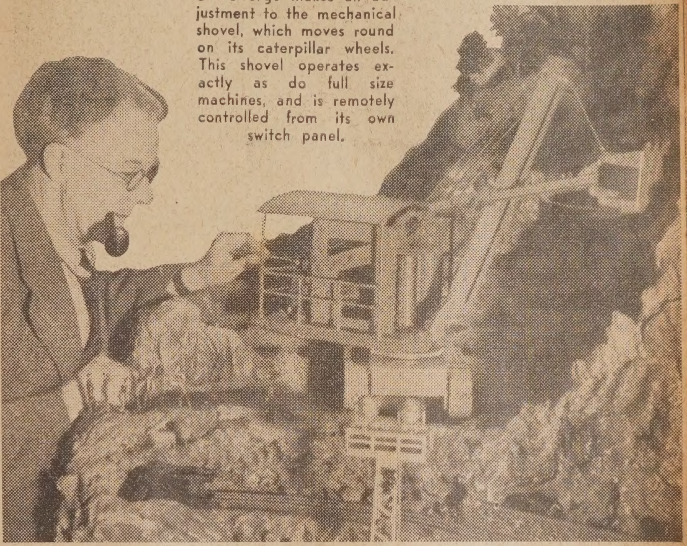
For instance, one such evolution consists in bringing up coal from a mine

OF MINIATURE ENGINEERING

Hobby of Sir George Julius

☆

Our only regret is that cold print and pictures cannot hope to do full justice to the subject of this article. Nor can we hope to give, within its limits, anything like an adequate picture of this marvellous piece of work. Only the use of illustrations in full color could do this. We express here our appreciation to Sir George Julius for the opportunity to tell you something about his twenty years of miniature engineering.



Sir George makes an adjustment to the mechanical shovel, which moves round on its caterpillar wheels. This shovel operates exactly as do full size machines, and is remotely controlled from its own switch panel.

in electrically-operated lifts. A locomotive takes away the coal, being diverted to either of two lifts by a turntable. It may then transport the coal through the railway system to the waterside, where an electrically-operated crane will lift it into a waiting barge floating in real water.

This barge is then taken into a "lock" which, entirely automatic, carries it to a lower level of water, and sends it out of the picture to the place where all good coal goes to.

Another mine has its iron treasure transported through the air in a bucket and cable system, to be tipped automatically at the other end.

Another crane, the most wonderful of them all, as it performs its work absolutely automatically, lifts the iron ore by means of an electro-magnet, and drops it into another barge which takes it away.

This would be a second evolution.

And so it goes on, until I felt like calling a halt before my mind refused to comprehend any further the fantastic wonder of it.

An engineer to the finger-tips, Sir George insists that all his models behave themselves exactly as do the originals. The various operations are exactly duplicated in the correct order. Only where the reduced size makes slight modifications absolutely necessary, is there any compromise.

For instance, there is a suspension bridge about six feet long, which is built just as an engineer would build a full-sized bridge. Its lines are a delight to the eye of the most critical. Sir George could not bear to look at it were it otherwise.

THE DREDGE

The most outstanding of the models which Sir George or his sons have built are the various cranes, and the dredge, which has a picture all to itself.

This latter is a perfect example of what model and mechanical genius can do. It has four electric motors inside the hull which incidentally, is built of metal and held together by rivets. This dredge picks up small beads from under the water, in its little bucket chain.

These may be discharged from either side into the barges, which carry them away. The dredge itself can move backwards and forwards, and performs its work with perfect precision.

By

JOHN MOYLE

A dry-as-dust description such as this cannot tell you anything of the exquisitely made gears, all built specially for the job, of the cables and their drums, each one a perfect replica of the real thing.

Or of the delicate little railing round the whole dredge, companion-way, and control platform. There are over a hundred tiny stanchions for this rail, each of which was turned out of brass by hand. Each was then drilled to take the railings. Special attention was required for the stanchions on the companion-way, which called for a different method of mounting. Even the little life-boat is a perfect model.

At the side of the dredge is mounted a perfect little crane, which did not appear to do anything. Sir George explained that a real dredge had to include such a crane, for removing anything brought up from the bottom, and which wouldn't pass through the mechanism. So, although he had no use for it, it annoyed him to see the model incomplete. He took an afternoon off, and made this accessory at one sitting!

Things such as this will give you an idea of his passion for perfect duplication.

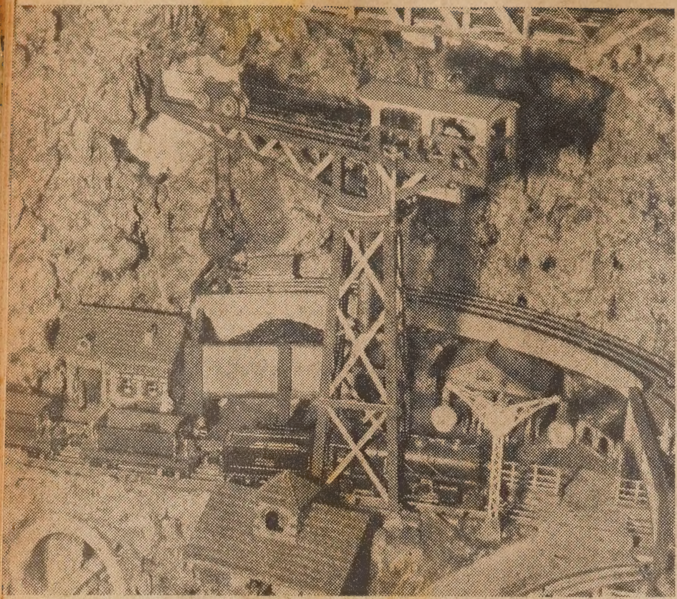
MAGNETIC CLUTCHES

Each of the little cranes has its own interesting mechanical feature. One, for instance, operates with a marvellous set of magnetic clutches, which turn it either way, control the lift, and open and shut the claws that grip the load. None of the cranes are touched when in operation, each is remotely controlled.

I was particularly fascinated by a mechanical shovel, which was mounted on a caterpillar platform. It is illustrated in one of the pictures.

This shovel can walk round its little platform, just like a real one. It bites

TWENTY



Another section of the model wonderland. Note the travelling overhead gear of this bucket crane. It loads trucks which are backed into the railway siding. There are a dozen complete trains, one of which is seen here.

nto the earth, lifts its load, runs round ntil in position, and releases it just vhere required, into a waiting truck, eady to be taken away wherever its naster should desire. A cable containng a bunch of flexible wires is the nly connection required for these evoutions.

THE LOCK

The operation of the lock, which raises and lowers the barges about six inches from one water level to another, is another marvel of ingenuity and precision.

It has two little sets of gates which open and close, controlled by mercury switches, and operated by the water levels. At just the right time, they allow the barges to enter and leave, at the will of the operator.

In order that they may do this, there is an electrically-controlled bridge, which reminded me of the Pyrmont bridge.

A set of railway gates closes at the right time, perfectly synchronised, and any approaching train is stopped until the operation is completed.

The bridge then rises in two sections to allow the barge to pass beneath it. It closes again, when the barge is safely through, and the railway gates open once more to allow the traffic to proceed.

POWER SUPPLY

The power supply required for the whole display, is obtained from the mains, and from batteries. This of course, required a switching and wiring system which beggars description. There must be miles of insulated wiring underneath the superstructure, which houses a mass of motors, gears, relays and control points. The installation of these would be a lesson to any electrician. Sir George knows only one way of doing things—the right way. There is not a poor piece of installation, or a makeshift connection, in the whole network. It would take several days to appreciate every device and assembly which goes to make up the whole display.

NO DETAILED PLANS

I was astounded to hear from Sir George that he makes no detailed plans when constructing any of the models. Apart from a few sketches, mainly required to check such things as clearances and dimensions, he works it all out in his head before commencing any constructional work.

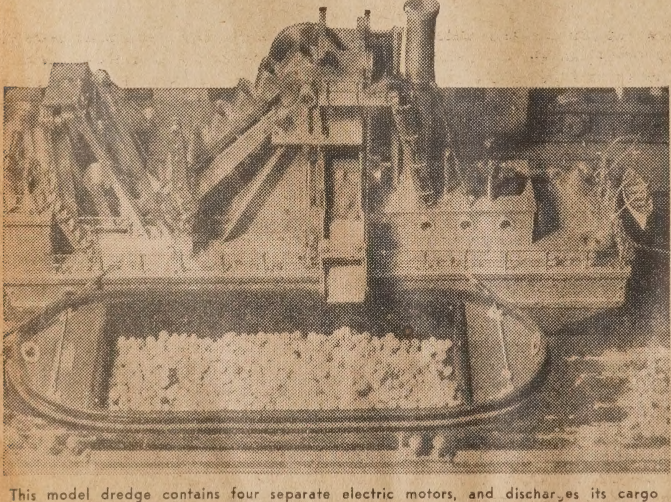
Once having decided what he wants to do, he gets to work in the work-shop, and gear-wheels, shafts, frameworks and assemblies pour from the tools, lathes and drills under his guidance.

The workshop itself is complete to the last detail. Very rarely does he employ any parts which are not made by himself. Three or four lathes, shelves filled with drills and so on, allow him to tackle the most difficult constructional problem, fully equipped to turn out an exquisitely finished job. The standard of his workmanship is so high, that it is almost impossible to find even the slightest fault with it. Only perfection is good enough for this mechanical genius.

One point puzzled me for quite a while, until I put the question. How could any fully-grown man possibly move about this maze of models, without crushing things under his feet?

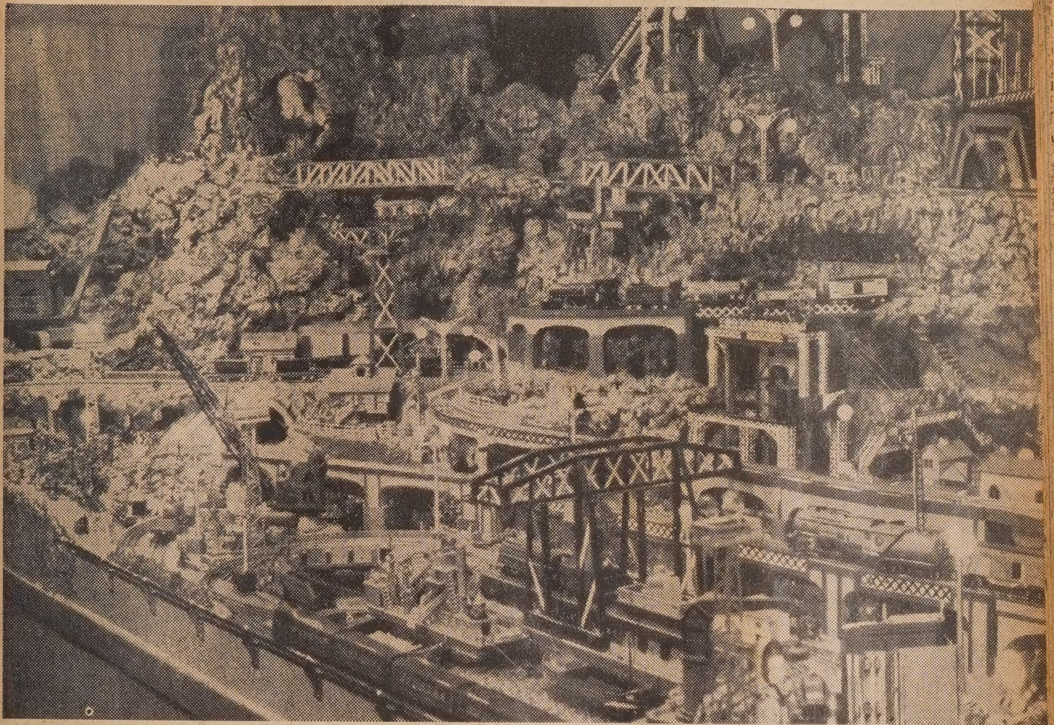
The answer was given by calling my attention to a moving platform, which runs along the full length of the display. This platform may be swung out over the whole, and any adjustments made while perched upon it. In this way, even large-scale construction work may be carried out without disturbing anything.

In addition, one or two well-concealed holes have been left which enable one



This model dredge contains four separate electric motors, and discharges its cargo into floating barges from either side. In many ways, it is the show piece of the whole collection.

YEARS OF MODEL MAKIN



This photograph shows about half the entire model. The mechanical shovel is seen at the extreme left. In the foreground is the dredge, and the barges floating in the water. The lock just misses the picture at the bottom right-hand corner. Right centre is one of the mineheads which unloads into trucks which are manoeuvred into place on a railway turntable. At the top right-hand corner can be seen one end of the suspension bridge.

to emerge from beneath the mass of wood, netting, and plaster, should this be necessary.

CHARITIES BENEFIT

Hundreds of pounds have been raised for charity, when Sir George has allowed public inspection of the whole display in operation.

When this occurs, each unit is put through its paces, and a friend, whom Sir George described as a "wonderful spruiker," points out the operation of each, from the pile-driver with its inertia control, to the electrical steam-engine which drives it.

More than once, he has discovered a fascinated youngster hiding under a curtain, unable to tear himself away from such a boyhood dreamland, and hopeful of seeing two sessions for the price of one.

And we may be sure that many a grown-up (Sir George confessed that although he can get 50 people into the room at once, he cannot as yet accommodate more than 20 members of the Police Force, who once came to see it), has shared in the wonder inspired by this marvellous model of modern industry.

TWENTY YEARS OF WORK

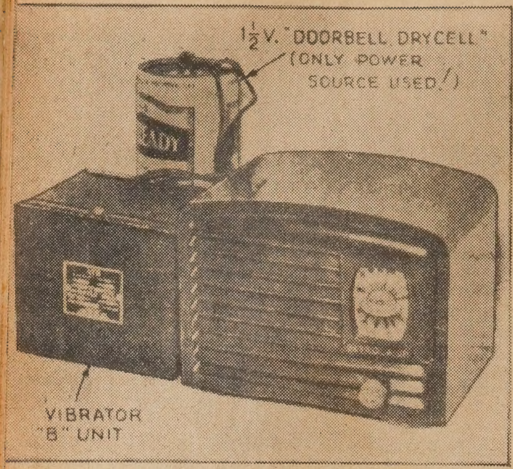
It is 20 years since the display had its beginning. Sir George had the idea of combining instruction with pleasure, mainly so that his sons could find ways of putting their growing technical knowledge into practice. Bit by bit the imitation hill-side grew, and there is no guarantee that it will not continue to keep on growing.

There is a spot at the extreme right of the display, which is at present occupied by a zoo—complete with fountains, monkeys, and tigers prowling in subterranean caves, and polar bears enjoying the luxury of a shower bath.

This spot has been earmarked as th possible site of an electrically-controlle saw-mill, which will receive rough timber, cut into planks, and unload i again into the railway system. As Si George outlined his ideas for this projected addition, I could not but be infected with his enthusiasm, which, for all his 65 years, burns as brightly as it did when he was a boy.

It will not matter one iota that the saw-mill when completed, will measure little more than a few inches instead of 10 times as many feet. For it will call for the same skill, the same mental equipment and genius, as would the full-sized original which lives only in his brain. And I know that it will work with the same unfailing precision which characterises everything else in this wonderland of models.

The TECHNICAL



A picture of the rebuilt set discussed in the article. It is shown with the vibrator unit, and an ordinary standard dry cell such as is used normally for bell-ringing, &c.

Dry-Cell Vibrator Set

This article, portion of one which appeared in the American journal, "Radio-Craft," concerns the operation of a vibrator power unit from a 1.5 volt dry cell. Whether this is a scheme to be recommended, however, is a matter open to doubt.

WE publish these details of the unit just as they appeared and for their own interest. It is difficult to see how the heavy drain of such a unit could be borne adequately by the ordinary dry cell without frequent replacement.

There are 2-volt vibrator units available on the Australian market, but these are made in the knowledge that the current required will be several amps. A good-sized accumulator will make light of this drain, but a dry cell is an entirely different proposition.

It does not appear likely that at present dry-cell vibrator sets will appear on the market, and several well-known makers have expressed the opinion that such sets would be impracticable.

In publishing these details, therefore, we are not suggesting that it comprises a solution to any battery set problem, although it is a suggestion which should bear careful watching in the future. It is not inconceivable that vibrator units should not be developed which may alter the position considerably.

"RADIO-CRAFT" EXTRACT

In order to make this set independent of any second or third set of batteries, as would be the case if "B" and "C" batteries were employed, it was decided to derive all the set's power from only the "A" supply.

Eliminating the "C" battery was simple —merely a matter of using "C"-bias cells, as shown in the schematic circuit. Note that under NO circumstances must any current whatsoever be drawn from these odd, self-generating devices; they become absolutely worthless if accidentally shorted, so wire these units in last, taking care to see that they are poled with positive terminal to chassis.

Eliminating the 90-volt "B" battery was somewhat of a problem until a solution was found which it is believed is described here for the first time in any radio magazine—a vibrator "B" unit of the general type used in 6-V. car-radio sets was completely redesigned to work from a 1.5-V. power supply, i.e., a standard No. 6 or "doorbell" size dry-cell.

Before the advent of the low-drain, 1.4-V. dry-cell tubes, such an arrangement would not have been economical; but now the idea is practicable.

VIBRATOR EFFICIENCY

Vibrators approach an efficiency of 60 per cent., whereas motor-generators and other arrangements which were analysed in the search for a device which would deliver a "B" voltage from the "A" supply were discarded, in 1937, as having too low efficiency (about 6 per cent. overall). Note, however, that a vibrator's efficiency is less at sub-normal "A"-cell voltage.

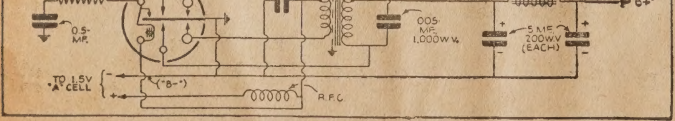
A study of vibrators was started last year, and in January, 1939, Pauley-James Corp. undertook to build for the writer a 1.5-V. full-wave, self-rectifying vibrator-"B" unit; it was completed in March, and the outside dimensions of its copper shield case were 4½ x 6¾ x 3 in. deep, with a weight of 4lb. 10oz.

Subsequently, American Television & Radio Co. built a unit, a little lighter, which measured only 4 x 3½ x 3 in. deep.

Both synchronous units were complete with all filter components and a step-up transformer, and were quite free of both mechanical and electrical hum.

MAKERS' INTEREST

Several of the biggest radio set makers are now understood to be working on this "B"-batteryless idea. One manufacturer points out that the large No. 6 dry-cell is well able to stand considerable current drain, and is less expensive in the long run than "B" supplies which employ batteries built-up of a large



Circuit diagram of the vibrator unit used with the receiver.

EDITOR'S WORLD REVIE

Developments in other land

number of small and (comparatively) inefficient cells.

Another important reason for using only a single dry-cell to power the set is that it is instantly replaceable—no fuss, no bother; and in an emergency, the chances of locating a dry-cell are far greater than of finding 45-volt "B"-blocks. It's also easier to get a fresh dry-cell—every hardware store carries them—than it is to get fresh "B" batteries; and the dry-cell has a longer shelf-life. Also, you have only two leads to connect, which reduces, if not eliminates, the possibility of reversing leads, or of accidentally connecting a "B" battery to the "A" leads and burning-out all the tubes (such things **do** happen!). And, finally, the necessity for special-size and type (poled, for instance) "B"-blocks is eliminated.

The vibrator-"B" unit shown here delivers about 9 ma. at 90 V., which is ample for this radio set. A sponge-rubber "coat" around the vibrator absorbs all mechanical vibration; it's impossible to hear it vibrating in a quiet room. **This vibrator-"B" unit may be used to replace "B" batteries in any equivalent battery-portable.**

New Multi-Purpose Valve Type No. 1D8-GT

Details of a remarkable new valve which should have a big influence on battery set design in the near future.

THE development of the 1.4 volt series has already had a marked effect on battery set design, setting new standards of economy. This new valve is actually three valves in one envelope.

It has first of all, a diode plate for detection, next a triode section with an amplification factor of 25, and finally, an output pentode section with an output of 200 milliwatts, at 90 volts high tension.

Thus it can replace two valves—the IH5G, and the IC5G

The valve indicates even greater economy than these two used singly. For instance, the total filament current is only .1 amps for the two sections, and the pentode requires only 6 mills total current for its full output, which, however, is a little lower than that of the IC5G. A bias of 9 volts is still required.

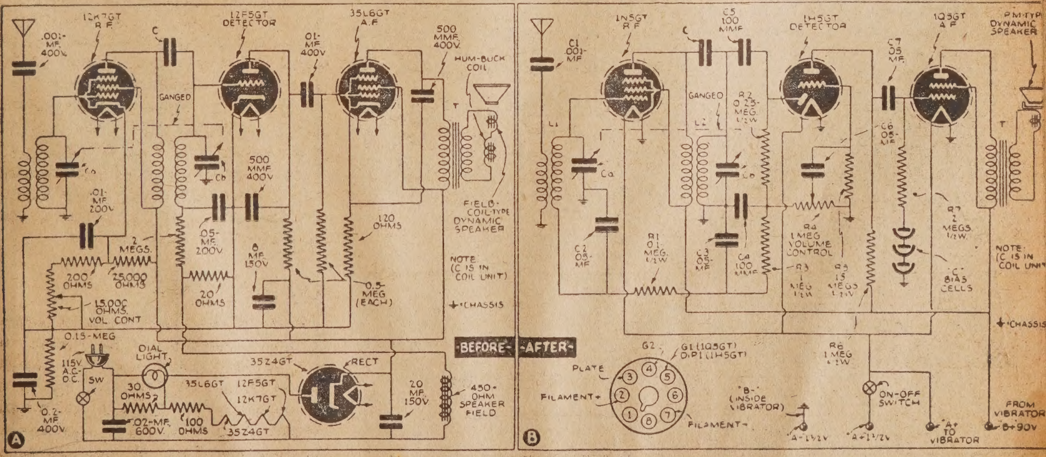
According to the data sheets, very kindly sent to us by the A.W. Valve Co., an octal base is used with the following connections: Pin 1, no connection; pin 2, filament positive; pin 3, pentode pla pin 4, pentode screen; pin 5, pent control grid; pin 6, triode plate; 7, filament minus; pin 8, diode; c triode grid.

Incidentally, the triode is again of t zero grid bias type, just as the IH5G.

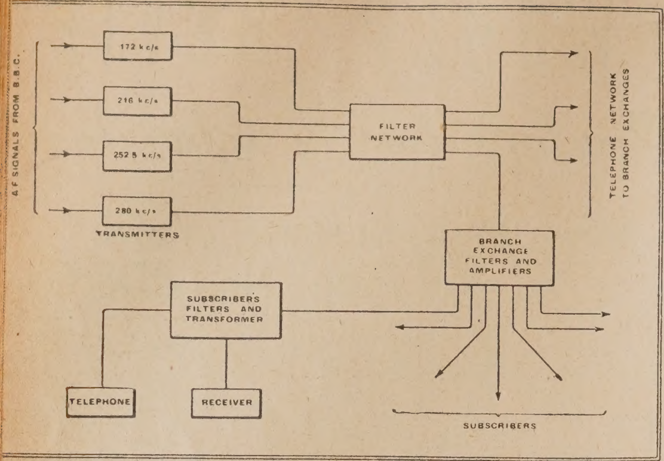
GREAT POSSIBILITIES

The possibilities of this valve are co siderable. The fact that it has been r leased in the 1.4 volt type, indicates t special attention which valve design are giving to these valves, against oth battery types. It is sure to be ve valuable, particularly in receivers whe space is a factor, and economy essenti In fact, it is probably the most efficie battery valve yet produced by val engineers, and universally available the public.

Stocks of these valves are not yet r leased in Australia, although no dou these will be here before long.


12K7GT R.F.
12F5GT DETECTOR
35L6GT A.F.
.001-MF. 400V.
C
GANGED
.01-MF 400V
500 MMF. 400V.
HUM-BUCK COIL
T
Ca
Cb
500 MMF 400V
.01-MF 200V
2 MEGS.
.05-MF. 200V
8 MF. 150V
120 OHMS
FIELD-COIL-TYPE DYNAMIC SPEAKER
200 OHMS
25,000 OHMS
20 OHMS
0.5-MEG (EACH)
NOTE (C IS IN COIL UNIT)
15,000 OHMS. VOL CONT
CHASSIS
0.15-MEG
115V. A.C.-D.C.
SW
DIAL LIGHT
35Z4GT
RECT
30 OHMS
35L6GT
12F5GT
12K7GT
20 MF. 150V
450-OHM SPEAKER FIELD
0.2-MF 400V
.02-MF. 600V.
100 OHMS
35Z4GT
A
BEFORE
AFTER
1N5GT R.F.
C1 .001-MF
C
C5 100 MMF
1H5GT DETECTOR
C7 .05 MF.
1Q5GT A.F.
PM-TYP DYNAMIC SPEAKER
L1
GANGED
R2 0.25-MEG. 1/2W
L2
C6 .05-MF
Ca
Cb
T
C2 .05-MF
R1 0.1-MEG. 1/2W
C3 .05-MF
C4 100 MMF
R4 1 MEG VOLUME CONTROL
R3 1 MEG 1/2W
R5 15 MEGS 1/2W
R7 2 MEGS. 1/2W
"C" BIAS CELLS
NOTE: (C IS IN COIL UNI
CHASSIS
G2
G1 (1Q5GT) D.P1 (1H5GT)
R6 1 MEG 1/2W
PLATE
FILAMENT+
FILAMENT−
"B−" (INSIDE VIBRATOR)
ON-OFF SWITCH
FROM VIBRATOR
"A−1½V
"A+1½V
"A+" TO VIBRATOR
B+90V
B

The two receivers—before and after conversion to vibrator operation.



A sketch showing how distribution would be arranged.

WIRED WIRELESS IN ENGLAND

POST OFFICE SCHEME

Wired wireless is not new, being used in various parts of the world, particularly in Europe. This extract from the "Wireless World," however, tells of a proposal to introduce the scheme in England.

THE announcement in the House of Commons that the Postmaster-General proposes to relay broadcasting by the telephone system is of great nterest to all. The method is a form f wired wireless, and consists essentially of the utilisation of the ordinary elephone wires to carry the modulated adio-frequency carrier.

FOUR PROGRAMMES

The proposal is to supply up to four alternative programmes on carrier frequencies of 172kc., 216kc., 252.5kc., and 280kc. The B.B.C. will provide the programme material and supply the audio-frequency signal by land-line to the Post Office, who will use it to modulate a small transmitter of a few watts output. Separate lines and transmitters will, of course, be needed for each of the four channels.

The outputs of the transmitters will be at different radio-frequencies, and can be combined with the aid of suitable networks and filters. The signals are then to be passed out over the telephone system. Amplifiers and filters will be provided at the branch exchanges, and the signals will finally reach the subscriber over his telephone lines.

AT THE LISTENER'S END

The subscriber will be provided with a distribution box containing high—and low—pass filters together with an output transformer. These filters are to separate the radio-frequency currents of the normal telephone service so as to avoid interaction between the two.

The output impedance of the system is to be 100 ohms, and the air is to provide 10 mV. of signal across this impedance. The subscriber will connect the aerial and earth terminals of his receiver to these output terminals and then tune in the relayed signals in the usual way. If he wishes to be able to use an aerial and obtain normal wireless reception as an alternative, he can do so by fitting a change-over switch so that the receiver can take its input at will from the telephone line or from the aerial.

The general arrangement described is sketched above in the form of a block diagram. The output of the transmitting filter network is shown as connected directly to the local exchange, but in many cases there will be several other intervening exchanges.

LESS INTERFERENCE

It is claimed that the system is not susceptible to interference from broadcasting stations. The carrier spacing to be adopted varies from 44kc. to 27.5kc., and thus will be adequate for really high quality reproduction. It should be possible to retain modulation frequencies up to 10,000c's., and with this channel spacing their retention in the receiver presents no technical difficulty. The ordinary broadcast set will not, of course, be able to take full advantage of this, but special apparatus which will do so will no doubt be developed as the need arises.

The immunity from interference should enable high quality reproduction to be obtained even by those who are a long way from a broadcasting station, and a further advantage is that the system is expected to be largely free from man-made interference. On trolley-bus routes, however, it may be necessary to connect subscribers by twisted-wire cables instead of the usual open pairs.

IN TIME OF EMERGENCY

Another advantage of the system is that it is immune from deliberate jamming by other stations, such as might occur in the event of hostilities, and it is less susceptible to damage by bombing than is the ordinary broadcasting system. Although local interruption of the service might occur, it is unlikely that more than a small proportion of the subscribers would be affected.

The system would not interfere with the normal use of the telephone, and calls can be made or received as usual whether or not the receiver is in use.

Systems of this nature have been adopted in Germany, and one such was described in "Electrical Communication" for April, 1938. This was the Lorenz system, and the use of modulation depths up to 80 per cent. was contemplated.

PHILIPS PATENT

Following the article in last month's issue, we noticed this recent patent notice, granted to N. V. Philips (Holland).

LOUD SPEAKERS

TWO or more diverging partitions, which extend inside and beyond the usual diaphragm, are used to improve the quality of reproduction. As shown in the figure, the partitions P and P1 are hinged at a point in or near the plane of the baffle-board B, to which the edges of the ordinary conical diaphragm D are loosely secured, as usual.

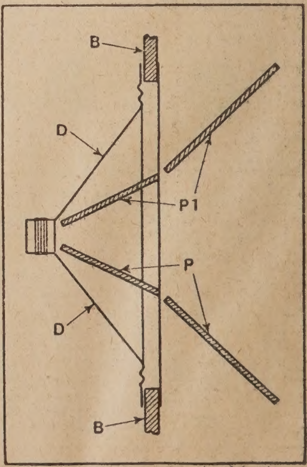
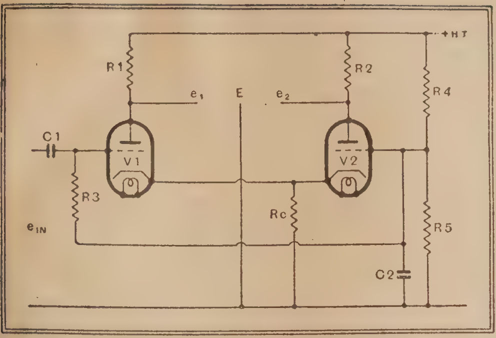
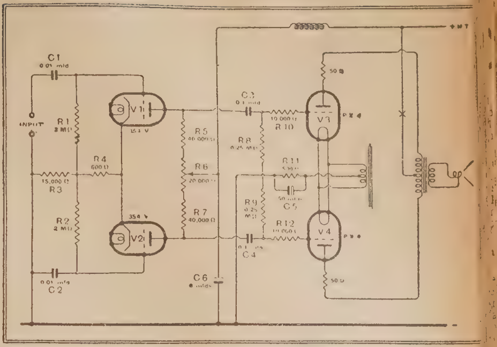


Diagram of the Philips patent.



The essential phase-splitting circuit is shown here. V2 derives its input from the cathode circuit of V1. There is some negative feedback on V1.



This diagram shows a phase-splitter feeding the output stage. This was the arrangement used for measurement purposes

A NEW CIRCUIT FROM ENGLAND

Simple Push-Pull

This circuit, which appeared in a recent issue of the "Wireless World," will remind many readers of the "Barnes" mystery circuit published in "Wireless Weekly" some years ago. We reprint here the analysis of the new circuit as it appeared in "Wireless World."

A NEW circuit offers distinct possibilities, however, and its basic arrangement is shown in Fig. 5. R4 and R5 are provided for grid bias purposes; for the moment ignore them and consider the grid of V2 as being returned to earth, as it is effectively for alternating currents. The input is applied to the grid of V1 and causes variations in its anode current which produce e1 across R1; the variations also produce voltage variation across Rc, which are applied to the grid of V2 and cause anode current changes in this valve, and hence produce e2.

CIRCUIT ANALYSIS

The operation is more easily understood by assuming a small definite change of grid potential on V1 and following its results. Suppose the grid potential changes in a positive direction. This causes a rise in anode current in V1, and consequently a rise in cathode potential and a fall in anode potential e1. The rise in cathode potential means that the cathode voltage of V2 rises with respect to the grid, which is at a fixed potential.

This is equivalent to a fall in the grid potential of V2 relative to its own cathode, and so the anode current of this valve decreases. This fall in anode current causes a fall in cathode potential and a rise in anode potential e2. e1 and e2 thus change in potential in opposite directions.

If R1 and R2 are equal, then for e1 and e2 to be equal it is clear that the alternating anode currents of the two valves must also be equal. They flow in opposite directions through Rc, however, so they will set up no voltage drop across it; consequently, V2 will have no input and be unable to produce an alterating anode current.

This is impossible, and if the valves are identical and R1 and R2 are equal, e1 and e2 cannot be equal. To make the outputs the same R2 must be greater than R1, for to obtain an input to V2 the alternating anode current of V1 must be greater than that of V2.

ACCURACY OF BALANCE

Although with R1 equals R2 perfect equality of output cannot be secured, the balance can be made as nearly perfect as we like by increasing Rc sufficiently. Then the input to V2 is very nearly equal to the grid-cathode voltage of V1. So far as V1 is concerned the voltage across Rc acts as a negative feed-back voltage and the stage gain of V1 is very nearly one-half of what it would be if Rc were absent. The input required for a given total output e1+e2 is almost the same as that needed by the same two valves in normal push-pull, but instead of the input voltage being balanced to earth it has one terminal earthed.

THE CATHODE RESISTANCE

The cathode resistance Rc cannot be increased indefinitely because of the voltage drop across it set up by th steady anode current of both valves. the current is 7 mA. and Rc is 20,00 ohms, the voltage drop is 140 volts an the effective operating voltage of th valves is reduced by this amount.

As the cathodes are at a high voltag with respect to earth, the grids cann be returned to earth, but must be take to a positive point. This is provide by the voltage divider R4 R5. Wit the cathodes at +140 volts the valve might need −4 volts grid bias wit respect to cathode, so in this case th potential at the junction of R4 and R must be +136 volts.

For a given anode current it is de sirable to make Rc as small as possible for then the voltage lost across it is minimum. The factors which affect R are the amplification factor of the valves their AC resistances and the values o the coupling resistances. In general, R1 must be roughly proportional to Ra to obtain reasonable stage gain and good linearity. As the current taken is als likely to be roughly proportional to Ra the voltage drop across Rc will be nearly independent of valve resistance for constant unbalance.

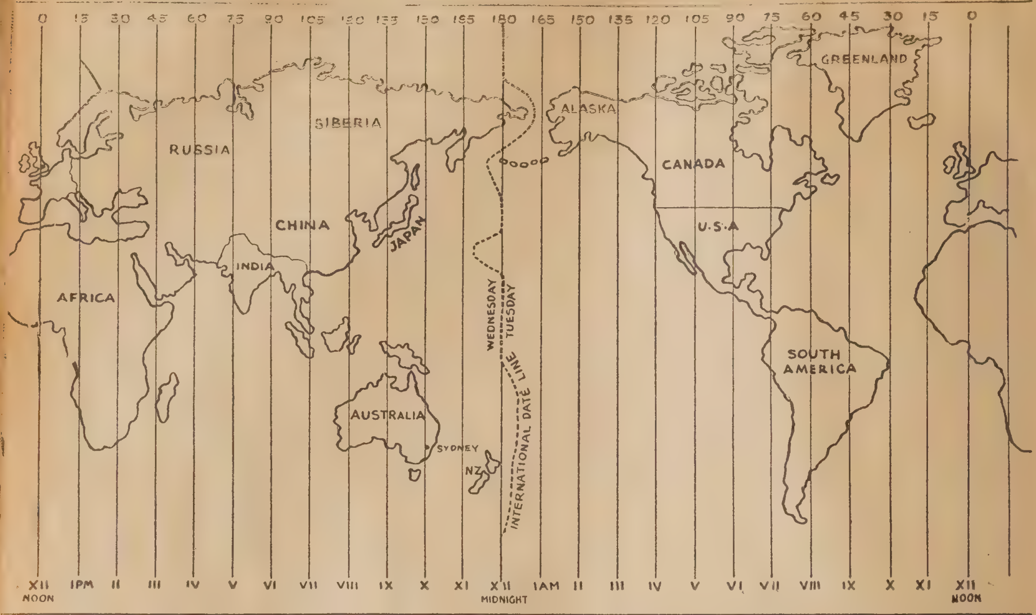
The only way to reduce the cathode voltage, therefore, is by increasing the amplification factor u. In fact, Rc and the cathode voltage are roughly inversely proportional to u, assuming the other values to be constant. Valves of high mutual conductance are, therefore, desirable.

MUSEUM ANIMALS WIRED FOR SOUND!

"Museum animals 'wired for sound'" was the title of a recent newspaper item. It seems that the American Museum of Natural History (N.Y.) is going to give visitors an opportunity to "hear" the stuffed African lions, Congo jungle birds, &c. Phono records reproduced from mobile equipment, will be used. These sound effects, including the music of jungle dancers, were made in the Museum's Akeley African Hall.

POPULAR SCIENCE

WHEN IT'S TUESDAY IN ALASKA



A map of the world illustrating the various meridians, and the position of the international date line.

Being an explanation of how time is calculated in various parts of the world. An intensely interesting subject which is to many people something of an eternal puzzle.

By

CALVIN WALTERS

WHEN you bolt your breakfast and rush for the train in order to save someone the trouble of punching the "bundy" on your behalf. When you are late for an appointment and miss out on a business deal, or you knock off work at 5.30, rush in for a quick one, and rush out at 6 o'clock. When, in your car, you cover a given mile in less time than that appointed by the law, and are "pinched," accordingly. When the ladies begin to have beauty treatment for those wrinkles, and the men buy hair-restorer, your favorite horse loses, and the mortgage becomes overdue, only then do we stop to consider the tremendous influence that time has on our daily lives.

SPEED AND TIME

Speed and time go hand in hand. In the old days time didn't matter very much. They worked you to a shadow, anyhow. You didn't have to watch the clock, because when you knocked off work depended on when the boss let you go. Sixteen hours or so a day. Ough! There were no awards, no motor cars, trains or aeroplanes, or six o'clock closing. Nothing to do but stay at home and play tiddly-winks or watch brave knights on their trusty steeds slay dragons on a Saturday afternoon, or perhaps watch a duel or two in the local woods.

In short, you had the longest possible time in which to get things done. Nowadays, with all our speed mania, the rule is to get things done in the shortest possible time and to try and beat the clock, if possible.

The development of our present-day time basis is too long a story to go into here. The ancient Egyptians (not the old ones, but the Egyptians who lived years and years ago) had a day divided into 24 hours, and from the time of Ptolemy until 1925 the day was reckoned from noon to noon. Then it was changed to, from midnight to midnight for astronomical reasons.

Later, with the development of railways came the adoption of a single meridian for each section or railway administration. If you don't know what a meridian looks like, just take a look at the map illustrated elsewhere. We are going to talk a lot about meridians. You will notice a lot of lines running up and down the map from north to south and cutting the equator at right angles. These are only imaginary lines, and are called meridians of longtitude.

MERIDIANS

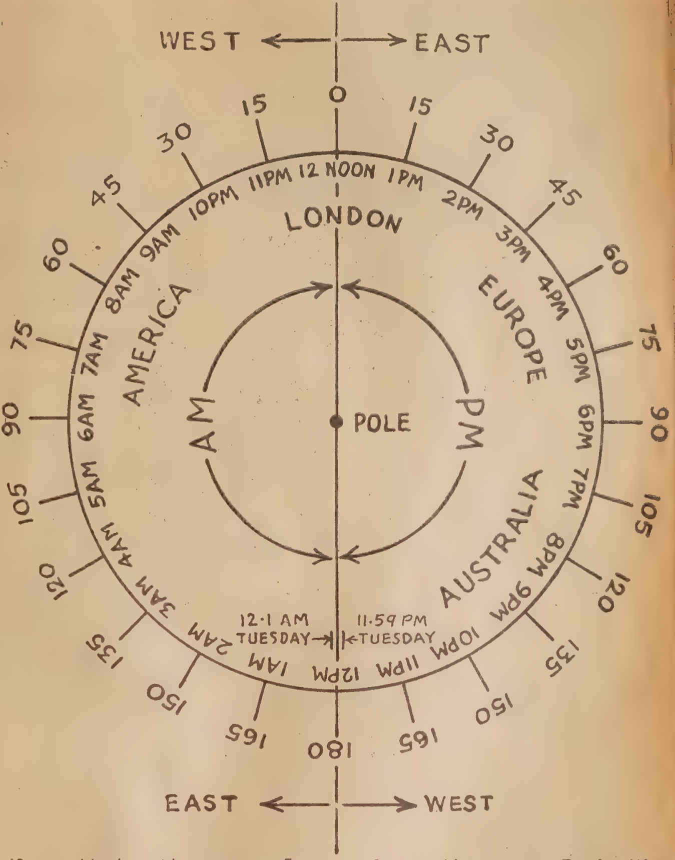
Every place upon the globe is supposed to have a meridian passing through it, although there are only 24 drawn on a globe or map. When the sun is above the meridian at any place (not within the Polar circles) it is noon at that place.

The first meridian is that from which geographers begin to count the longtitude of places. This meridian, or nought meridian, passes through London at the Observatory at Greenwich. Now, to get on to this time business.

If you remember your geometry you will know that there are 360 degrees in a circle. Now, the sun moves round the earth once in every 24 hours approximately. The sun doesn't actually go round the earth, as you well know. But for the purpose of illustration it doesn't matter whether the sun stands still and the earth moves, or vice versa. It is simpler for the purposes of illustration to assume the sun as moving. I am offering this qualification before anyone accuses me of going back to the dark ages when they thought the earth was flat and all that sort of thing.

Now, there are 360 degrees in a circle, and the earth is circular. The sun, moving round the earth once in 24 hours, therefore, moves through 360 degrees every 24 hours, or 15 degrees per hour.

IT'S WEDNESDAY OVER HERE



12 p.m. Monday with respect to East of the line. One minute later, it is 12.1 a.m. Tuesday morning.

12 p.m. with respect to Tuesday West of the line. One minute later it is 12.1 a.m. Wednesday morning.

There are then drawn upon the map 24 lines, or meridians, dividing the earth from north to south, each meridian being one hour away from the other.

Look at the map again, and you will see that the meridian running through London is marked 0. The next one to the east is one hour ahead of London in time, because the sun, rising in the east and moving west, must pass this point earlier than London. So that, if it is midday on Tuesday in London, it will be one p.m., Tuesday, at the first meridian. Similarly, it will be 2 p.m. at the 30th meridian, and so on round the world eastward to the 180th meridian, where it will be midnight on the same day.

Starting again at London and going west, it is obvious that, if it is midday at London, the time at the next meridian west will be one hour **behind** London, because the sun reaches London first. The time, therefore, will be 11 o'clock in the morning at the 15th meridian west, 10 o'clock at the 30th meridian west, and so on back to midnight at the 180th meridian.

HOURS AND DAYS

Everything so far is plain sailing. As far as the hours are concerned, no matter where you are on the globe, you will be in the same day.

Just look at the second diagram, and this will be at once clear. If you cast your eye at the diagram at the 180th meridian and start to go **east** from there you will (assuming it is midnight at the 180th) go into 1 a.m., say, Tuesday, 2 a.m., 3 a.m., and so on to London, where it is 12 o'clock midday, Tuesday. Then to 1 p.m., still Tuesday, right back to 11 p.m. and midnight. So you see it is the same day everywhere on the globe.

The fun starts when you are travelling. Say you were in a boat travelling from America to Australia. That is, you were travelling west.

Now, some time or other you would reach the 180th meridian. Assume, again, it was Tuesday when you arrived at the 180th. If you think a moment and glance at diagram 2 it will be apparent that, if it is, say, one minute past 12 a.m., Tuesday, on the American side of the 180th, it will be one minute to twelve p.m., Tuesday, on the Australian side of the 180th.

Two minutes later you cross the meridian. But by that time it will be one minute past midnight on the Australian side and three minutes past twelve on the American side. It will still be Tuesday on the American side, but **it will be Wednesday on the Australian side**. That is, you have jumped right from Tuesday morning to Wednesday morning all in the space of two minutes. In other words, you have lost a day.

On the other hand, if you are travelling eastward from Australia to America, and reach the 180th meridian at midnight on Tuesday, it will only be the early morning of Tuesday on the American side, and you start Tuesday all over again and so gain a day. As soon as you cross the line it is the early morning of Tuesday, while it is the early morning of Wednesday just across the line only a few miles away.

This line where the day moves forward or backwards is called the International Date Line. Time is reckoned from this line, and the day starts and ends at midnight. The line follows, roughly, the 180th meridian, deviating from its course in order to avoid running through inhabited places. The line is clearly marked on most maps, and it can be followed on the map from the North Pole down through the Bering Straits, swinging west past the Aleutian Islands, back to the 180th meridian straight down to near Samoa, swinging east to miss the group of islands around this area, then down past the islands east of New Zealand, and so to the South Pole.

It will readily be seen that anybody living directly on the date line would be at a loss to know what day it was. If it happened to be midnight on the line, it would be midnight, Tuesday, with respect to the western side, and midnight, Monday, with respect to the eastern side.

It sounds queer, but a fact, nevertheless. Remember the old song, "When It's Midnight in Italy It's Wednesday Over Here"? Perhaps the composer was studying the date line.

No matter what time of day you cross the line, you lose or gain a day, as the case may be.

In actual practice, it would be very inconvenient for us if each community used the local mean time. That is, the time according to the meridian. By common consent, therefore, each group of countries has adopted what is called Standard Times for that group. Imagine

(Continued on Next Page)

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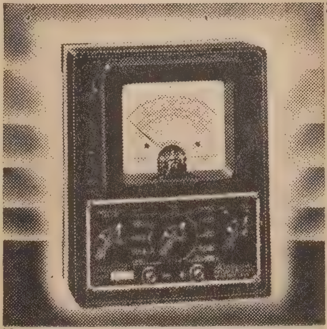

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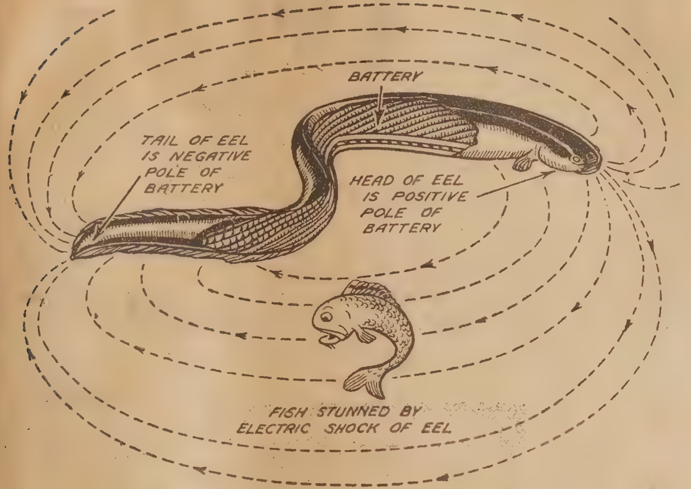
THE ELECTRIC EEL


BATTERY
TAIL OF EEL IS NEGATIVE POLE OF BATTERY
HEAD OF EEL IS POSITIVE POLE OF BATTERY
FISH STUNNED BY ELECTRIC SHOCK OF EEL

CAN KILL A MAN!

IN their efforts to find just what their batteries can do, Exide technicians have carried their experiments so far as to obtain an electric eel from South America.

These electric eels can generate sufficient electrical energy to stun a horse or even kill a man, and "Exide," as the eel is named, demonstrates his ability to produce electricity by lighting a Neon lamp. Although "Exide" is only 18in. long, he is a comparative youngster, and will eventually grow to a length of four or five feet.

The batteries of the electric eel (see diagram) are composed of hundreds of thousands of minute muscular plates, separated by an electrolytic fluid. Because the electric tissue is a modified form of muscle, it is believed that the chemical processes by which energy is released in human muscles are also utilised in the tissues of the electric eel. Muscular activity is a conversion of energy in two stages: First, from chemical to electrical; second, from electrical to mechanical muscular contractions. In the organs of the electric eel this ratio may be reversed. The eel's electric organs produce voltages 1000 times greater than is developed by human muscular activity.

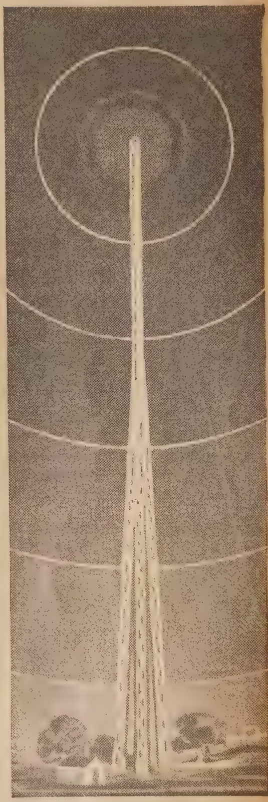
WHEN IT'S TUESDAY IN ALASKA

(Continued from Previous Page)

the confusion that would exist if Australian times were taken as those by the sun; in other words, the true time or mean time. The mean times of the various Australian cities are as follows: When it is noon at Sydney it is 11.35 a.m. in Melbourne, 12.7 p.m. Brisbane, 11.10 a.m. Adelaide, 9.39 a.m. Perth, and 11.45 a.m. Hobart. On February 1, 1895, Standard Time in the Commonwealth was adopted, so that Eastern Standard Time makes the same time for N.S.W., Queensland, and Victoria, except the Broken Hill police district in N.S.W., which takes South Australian time. Eastern Standard Time takes the time at the 150th meridian (see the map), South Australia takes that of the 142½ meridian, and Western Australia takes that of the 120th meridian.

Other countries have adopted the same idea, so that we have Central European time, Eastern European time, Eastern Standard of America, Atlantic time, etc.

For those people who are interested in racing, the above will clear up a question that is frequently asked. Melbourne can continue their programme longer than can Sydney. Why? This lies in the fact that the true time of Melbourne is 25 minutes behind Sydney, while their Standard Time is the same as Sydney. This means, of course, that the sun really sets later in Melbourne than Sydney, and they have a bit longer daylight than Sydney. Now you know.



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By L. B. GRAHAM, Principal of the Australian Radio College, Pty.,

☆

THE THEORY CONCERNING CONDENSERS

N all radio there is nothing quite so simple in mechanical construction as a condenser, and yet there are very few things of more importance or very ew electrical actions more difficult to nderstand.

A condenser just simply consists of two plates of conducting material separ-ted by an insulator. Its main function s the storage of electrical energy, and n this capacity it is used in practically very stage, in one form or another, f receiving and transmitting equipment.

The explanation of a condenser's ction revolves on the electron theory, nd if you are not quite familiar with his theory go over the first part of the ourse before continuing.

The insulating material between the two plates of a condenser is termed the dielectric and in conjunction with the plates is responsible for the condenser's "capacitive" or storing action.

INSULATORS AND CONDUCTORS

The electrical difference between an insulator and a conductor is that electrons are very difficult to move in an nsulator, whereas the electrons in a conductor move quite freely. The electrical action which takes place in a dielectric is the same regardless of whether it be mica, paper, air, gas, or any other insulating material.

The dielectric, like all other matter, consists of atoms, each atom being made up of protons and electrons. The number of protons and electrons will, of course, depend on the material being used as the dielectric. To simplify matters, an atom consisting of one electron and one proton will be used in the explanations.

Fig. 1 shows a condenser in its normal unchanged state. The two plates have a like number of electrons, and the electrons in the dielectric are revolving in their normal orbits, around their protons.

If an unchanging voltage difference is applied to the condenser's plates the position of electrons in both the plates and dielectric is altered considerably.

As unlike electrical charges attract, the positive side of the voltage source will attract the electrons from one plate, leaving it deficient in electrons. The other plate will receive more electrons, as it is connected to the negative terminal of the voltage source. One plate now being deficient in negative charges of electricity becomes positive. The other, due to its surplus of negative electricity, is negative. The effect on the dielectric of these positive and negative plates is shown in Fig. 2.

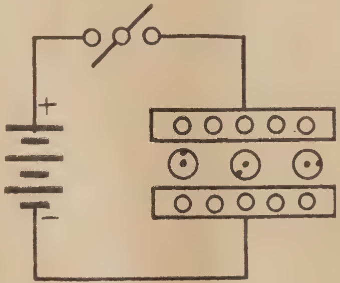


Fig. 1. Each plate has the same number of electrons. The electrons of the dielectric revolve around their protons on their normal orbit.

The positive plate will attract the negative electrons in the dielectric material, and these electrons will tend to move towards the positive plate. They are, however, held securely by their own protons and, unless the attraction is very great, will not leave their protons.

WHAT HAPPENS?

The effect created by these forces is that the electrons are pulled towards the positive plate, but, up to a point, do not leave their proton. The electron orbit becomes distorted as shown in Fig. 2. This condition would be maintained as long as the voltage remains applied and in a theoretically perfect condenser would be maintained indefinitely with the voltage removed, providing the condenser is not discharged by some electrical means. The negative plate, of course, exerts a repelling force on the negative electrons of the dielectric.

Should the plates now be disconnected from the source of voltage and connected together by some circuit such as a piece of wire, the attraction of the positive plate will be applied to the crowded electrons in the negative plate and these will move through the circuit or wire until the same number again exists on either plate. The electrons in the dielectric will return to their normal orbits. The pressure throughout the circuit will then be equalised and all action will cease.

Similarly, if the source of voltage is reversed, the same action will take place in the opposite direction, as shown in Fig. 3.

When a continually changing or alternating voltage is applied to a condenser the action just described will take place rapidly, first in one direction, then in the other, the electrons moving in sympathy with the applied voltage.

IMPORTANT FACTS

Three very important facts can be deduced from the foregoing explanation.

(1) The electrons in the dielectric do not, under normal conditions, pass from the dielectric into either plate.

(2) Electrons move from one plate through the external circuit to the other plate while the condenser is discharging or charging.

(3) When an alternating voltage is applied the electrons are moving continually, first in one direction and then in the other, through the external circuit. The number of changes in direction per second depends on the frequency of the applied voltage.

Electron movement constitutes a current flow. We can see from the above that no current, A.C. or D.C., will pass right through the condenser's dielectric. The flow of current occurs from one plate through the external circuit to the other plate. When a direct voltage is applied current flows only when the electrons in the dielectric are moving, and ceases immediately they have taken up their new position. Current, then, will only flow in the external circuit while the condenser is charging or discharging except for a minute leakage current which, in a good condenser, may be neglected.

ALTERNATING CURRENT

With an alternating applied voltage the electrons of the dielectric will be continually changing their positions. The plates will rapidly obtain first a scarcity then an abundance of electrons, and current will be continually flowing first in one direction, then in the other, through the external circuit. In other words, a condenser allows alternating current to flow, but except for the first instant of charge or discharge provides an open circuit to direct current.

Breakdown in a condenser occurs when the voltage applied to the plates provides a greater attraction for the electrons than their protons. Under this condition a spark discharge occurs through the dielectric materials. In the case of condensers using such dielectric materials as paper, mica, etc., the spark burns a hole through the dielectric. The carbon formed acts as a conductor and forms a short circuit. The condenser is then of course completely ruined. The dielectric material's ability to resist breakdown is termed its dielectric strength. A condenser's ability to store electrical energy is known as its capacitance or capacity. The unit of capacity is the farad.

THE FARAD

A condenser having a capacity of 1 farad is of such size that it will store 1 "coulomb" of electricity with an applied voltage of 1 volt.

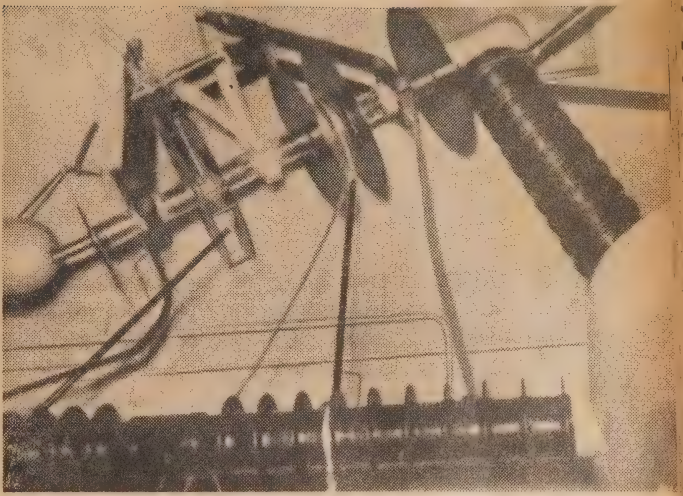
A coulomb is a measure of a definite quantity of electricity just as a gallon represents a definite quantity of water. It is the total amount of charge contained by 6.29 x 1018 electrons.

The farad is much too large a unit for radio work, and is reduced to microfarads and micro-microfarads, a microfarad being 1 millionth part of a farad, and micro-microfarad 1 millionth part of a microfarad.

The capacity of a condenser depends on the plate area, the distance between plates and the dielectric material.

The greater the surface area of the plates the greater the number of electrons it can accumulate with a given voltage and the current flow in the external circuit will be increased, other factors remaining the same.

Decreasing the distance between plates decreases the thickness of the dielectric material. As the plates are closer together the attraction of the positive plate for electrons and the repulsion of the negative plate will be more concentrated, so that there will be a greater strain placed on the electrons attached to the dielectric atoms. This will increase the condensers capacity. The greater the separation between the plates, or the thicker the dielectric material, the smaller will be the condenser's capacity.



A Giant X-ray tube at the Amsterdam Cancer Institute. The tube is suspended from the ceiling, and operates at a potential of one million volts.

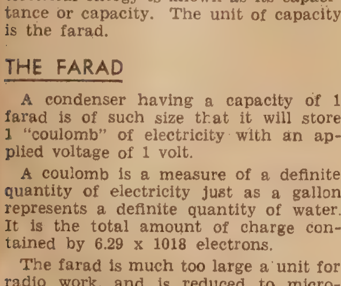


Fig. 2. Showing the distortion and accumulation of electrons in the negative plate when voltage is applied.

PAPER DIELECTRIC

If a waxed paper dielectric is substituted for an air dielectric of the same size the condenser's capacity will be increased by two or three times. Mica used as a dielectric would increase the capacity by five or six times.

The ability of a dielectric material to increase the capacity is termed the "dielectric constant" and is due to the difference in the number of electrons which can be forced out of their normal orbits.

Air is taken as having a dielectric constant of 1 and all other materials are compared to an air dielectric. The dielectric constant of any material is a variable factor, depending on the grade and quality of the sample, and on the applied frequency.

No condenser is perfect. There are four main sources of loss—resistance, leakage, absorption, and hysteresis.

Resistance loss is that due to the flow of current through the resistance of the metal plates of the condenser. Due to the large surface area of the plates, and to present day construction, this loss is not serious.

If a charged condenser is discharged and, after a short interval discharged again, a second flow of current will noticed. It apparently required son time for the electron orbits to readju themselves. When a condenser charged and discharged rapidly, as it when subjected to radio frequencies, does not have time to discharge completely before the next charge com along. The energy taken in the charg is not all returned on discharge. A lo known as the "dielectric absorption loss occurs from this effect.

It requires force to move an electro from its normal orbit when a condense is charged. On discharging the electro does not immediately return to norma If the charge is quickly reversed th electron has to be forced back to norma before it can be distorted in the opposite direction. The force exerted i returning the electron to its normal orbi is completely wasted. This loss, whic is known as "dielectric hysteresis loss, increases with the applied frequency, a there is then a greater number of reversals of the electron orbits in one secon

There are several different types o condensers used in radio work, thei construction and operation will b studied in the next article.

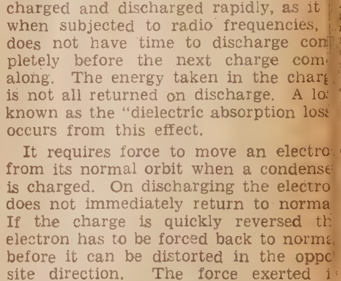


Fig. 3. The effect shown in Fig. 2 takes place in the reverse direction when the voltage is reversed.

IMPLE AUDIO OSCILLATORS

design and construction

This article outlines some of the things to be considered when constructing simple audio oscillators. For those who would like to further experiment with such oscillators, the writer has included some data on winding transformers, all of which he has made use of in his own experiments. All the oscillators described here are very easy to build.

HE principles of all valve oscillators, either R.F. or A.F., are very similar, and they consist sically of two tuned circuits (or e equivalent). One circuit between id and cathode (the filament is the thode in directly heated valves), and e other between plate (anode) and ament, electrically speaking.

OWER SUPPLY

Some circuits use a fairly large connser between the B x connection to e oscillatory circuit and cathode to ep it at earth or cathode potential oscillatory currents.

Some form of power supply must be terposed between the oscillatory circuit and earth. In our case it is tween the telephones and earth in gs. 1 and 2; in the other cases it is tween the plate coil and earth. The ad is broken by a key, except in case Fig. 5. This power supply gives us the energy to operate our phones or, in the case of R.F., energy radiated.

The action of the power supply is to charge the plate positively and attract the electrons emitted by the heated valve filament. Oscillation will take place only when the energy fed back from the plate to the grid circuit is sufficient to stop and start the electron flow in the plate circuit. Small currents flow in the grid circuit, but they are usually neglected in cases like ours.

By inserting headphones or speaker in the plate circuit, we can make our oscillator produce an audible note.

We can couple our phones to the oscillatory circuits by various methods, such as direct (Figs. 1 and 2), inductive (Figs. 3, 4, 5 and 6), or capacitive, as shown Fig. 6 alternative position.

The power lost in the valve and absorbed by the headphones in producing the audible note is taken from our power supply.

Let us now take a simple circuit (Fig. 1) and construct an oscillator as per July "Radio and Hobbies." Here we have two coupled circuits, A and B, connected as shown.

THEORY

When the filament of the valve is lighted and the key pressed, a positive voltage is applied through the plate winding of the transformer. This voltage causes a small current (1 or 2 m.a.) to flow through the phones, transformer primary, the valve, and so down the negative filament leg back to our B or H.T. battery.

This current takes a certain small fraction of time to rise to its final value. Now, in doing so, it induces a voltage across the secondary winding of our transformer.

This winding is so connected that it applies a negative potential to the grid of our valve, so causing it to stop the electron flow and hence the current through the phones. Immediately this current begins to decrease in the plate

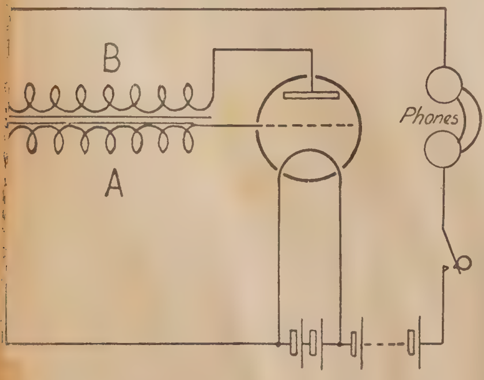


Fig. 1.—This circuit usually gives a low harsh note. No provision is made for adjustment.

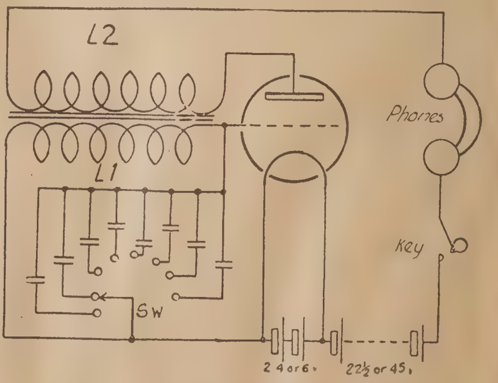


Fig. 2.—This circuit gives a very high note with C1 condenser in circuit, and output dropped off as capacity was increased.

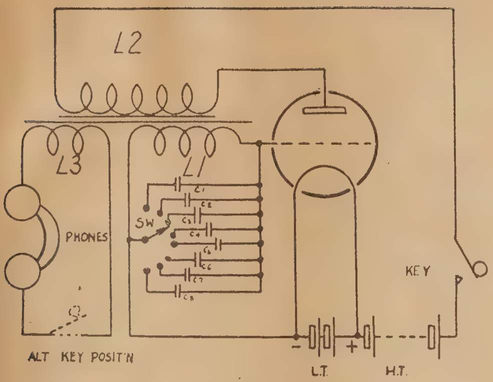


Fig. 3.—The most practical of the circuits described. Good output over the whole range. Transformer is easy to construct.

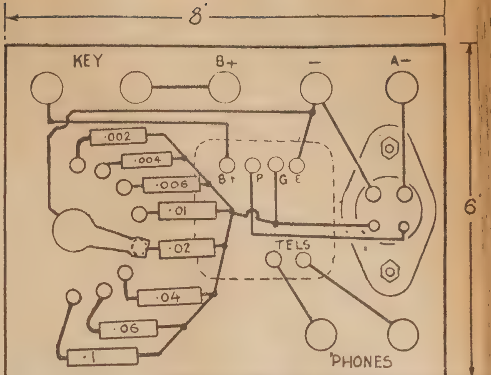


Fig. 4.—This circuit operates well but is rather difficult to build up.

circuit, the voltage across the transformer secondary begins to change to a positive value. The voltage on the grid of the valve lags on the plate current by an amount equal to approximately 90 degrees. This means that when our plate current is almost at a minimum our grid voltage is half-way to its minimum. It then begins to take effect, causing (as we explained before) the plate current to drop.

As the plate current drops the grid voltage drops, but still that "so much" behind. When the plate current reaches its minimum value it again begins to rise, and the whole cycle is repeated. When the circuit continues to behave in this manner it is said to be "oscillating."

This rise and fall of plate current causes the telephone diaphragms to vibrate in step, and so give out an audible note or tone. The key in the circuit is only to control the length of time for which the circuit oscillates.

As the ordinary valve and transformer combination usually produces a very low note, we have carried out a number of experiments to increase the note frequency.

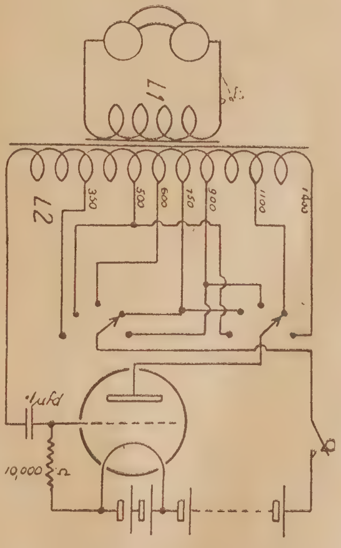


Fig. 5.—Simplified circuit of an English commercial oscillator.

To cut down on inductance, we woun a transformer of few turns. Our tran former as used in Fig. 2 consisted o 500 turns for L1 and 250 turns for L wound on an old ¾in. x ¾in. audio trans former core. It was connected in th same circuit as Fig. 1 except that had a number of fixed condensers acros the grid circuit for note variation.

SEPARATE PHONE WINDING

Any one of these condensers coul be connected into circuit by means c selector switch SW. The note wit a small condensor in circuit was to high to be of any use, and when large condensers were used output droppe off considerably. The note also altere considerably on changing from 120 ohn to a 2000 ohm pair of phones.

We therefore decided to try a separat winding for telephones, and, as the not of our former model was only a his with .002 ufd. in circuit, we rewoun our transformers with twice as man turns—i.e., L1 1000, L2 500 turns re spectively.

Another winding, L3, of 500 turns was also wound for phone connections and, although the impedance is low for a 2000-ohm pair of phones, they gave quite a good output.

We found here also that our not

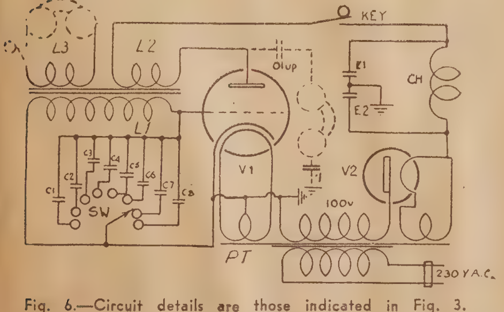


Fig. 6.—Circuit details are those indicated in Fig. 3. Alternative phone positions are shown. See text for further details.

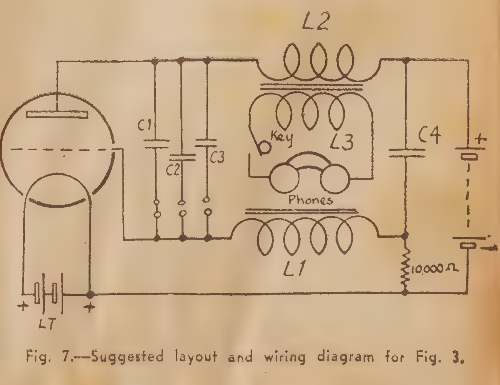


Fig. 7.—Suggested layout and wiring diagram for Fig. 3.

anged materially with load; but this peared unavoidable, and adjustment uld be made by means of SW. What s more important to us was the fact at there was no noticeable fall-off output on rotating SW. through its l arc from C1 to C8.

In this circuit (Fig. 3) the key is nnected as before and a rather de- able alternative shown in the tele- one circuit. This key connection has e advantage of eliminating key clicks.

ARTLEY CIRCUIT

The next outfit constructed uses a ries Hartley circuit (Fig. A), and, though it performs quite well, the ansformer is rather difficult to wind ith fine wire and the multiple switches e fairly expensive. They retail at bout 7s 6d each. Alternative key posi- on is again shown in the telephone rcuit, and the numbers on L2 indicate e tappings.

Another type which the writer has perated is diagrammed in Fig. 5. This a commercial product by an English rm and used for intercommunication etween wireless offices in warships.

A keying relay was fitted in the tele- hone circuit and operated the set from arious keys fitted in all necessary positions. "Repeaters" were also fitted so outlying stations could hear the others. This circuit has been modified slightly for simplicity, and uses what is known as a "divided circuit."

Values suitable are: L1, 1000 turns; L2, 500 turns; L3, 500 turns; C1, .02ufd.; C2, .04ufd.; C3, .06ufd. C4 is a 1ufd. condenser placed across the outer ends of the windings. The grid leak value is shown as 10,000 ohms, but is not critical. Adjustment is made by connecting C1, C2, or C3 into circuit as required by connecting between the six terminals provided for the purpose.

CIRCUIT VALUES

Values for other circuits shown are as under:—

Figs. 3 and 6: C1, .002; C2, .004; C3, .006; C4, .01; C5, .02; C6, .04; C7, .06; C8, 1 ufd. L1, 1000 turns; L2, 500 turns; L3, 500 turns.

In Fig. 3 batteries are used—LT according to valve filament rating, HT between 22½ and 45 volts is suitable.

In Fig. 6 the windings on PT are made to correspond to the requirements of the valves. V1 winding should be 2.5, 4 or 6.3v. as required. V2 filament winding as required. A triode as V1 may be used as V2 with grid tied to plate. If an indirectly heated valve is used as a rectifier, connect CH to cathode. V2 is used as a half-wave rectifier, and rectifies the output of the 100-volt winding.

CH can be any smoothing choke that is on hand, and E1, E2 and 8ufd electrolytics; a low-voltage (350v.) type is suitable. If you already have a 385-0.385 transformer, full-wave rectification can be used and a tap made about half-way down the voltage divider.

Old B eliminators are just the thing for a job like this.

V1 is any A.C. triode such as a 56, 76 or 227.

Using an A.C. supply it is advisable to key the telephone circuit and obviate the risk of shocks from the high voltages present.

Fig. 7 shows a suggested lay-out for a set and wiring diagram for Fig. 3.

Note.—When operating from high-voltage supplies, be sure and isolate the phones. Two .1ufd. condensers, as in Fig. 6, or a separate heavily insulated telephone winding is needed to keep D.C. out of the phone.

From this article it may be seen that quite a variety of circuits may be used for even a simple audio oscillator, and, as lay-out is not critical—let's go to work!

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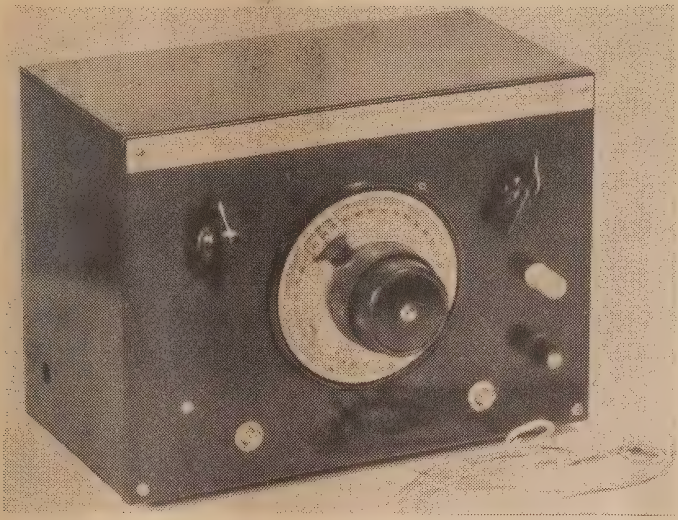


A front view of the oscillator. It is contained in a black, lacquered steel case.

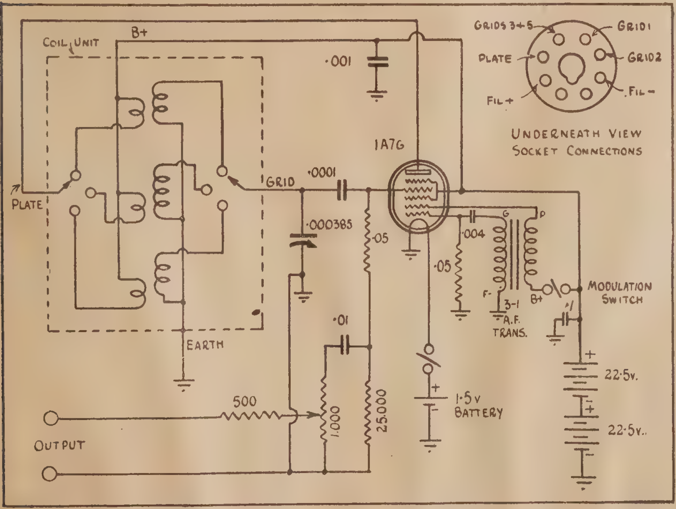
☆

By R. LACKEY
A.M.I.R.E. (Aust.), Dip. W.I.A., C
Instructor, Australian Radio Coll

☆

A SHORT time ago we described the construction of a simple modulated oscillator for operation from A.C. power mains. This oscillator proved so useful and popular that we now present the description of a similar type of oscillator, only one which can be operated from batteries, so that it is useful in districts where A.C. power mains are not available.

This oscillator is not intended to be a high-class signal generator, but is designed mainly with the view of being an extremely simple and inexpensive unit which anyone can construct, which will be quite suitable for alignment and the majority of ser work.



The circuit of the oscillator illustrates its simple design. Valve connections are shown also. Control grid at cap of 1A7G.

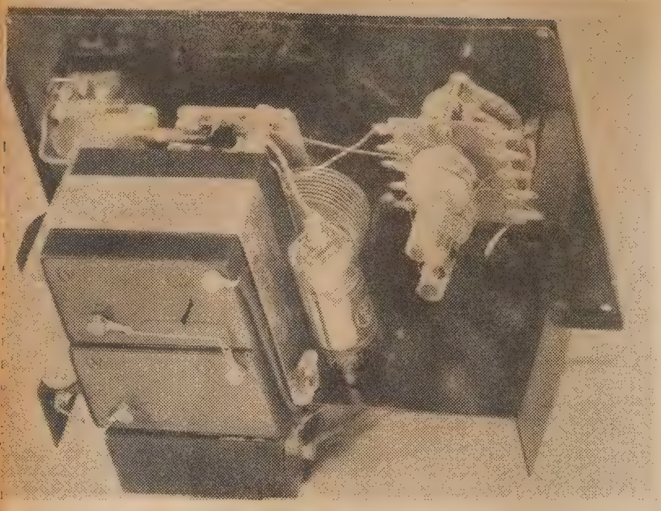
1.4 VOLT VALVE

One of the new 1.4 volt 1A7G tube used, both as a radio frequency os lator, for producing the various ra frequency signals, and also as a cycle A.F. oscillator, which is used modulate the R.F. output. The f ment, grid No. 1, and grid No. 2, employed as a simple triode tube, connected to an A.F. transformer, of ordinary type, that this section os lates at a frequency of 400 cycles second. The audio frequency volta applied to grid No. 1 and grid N then modulate the current which pa into the remaining section of the t This section is connected by means the selector switch of either of the th coils provided, so that a modulated nal is available at any of the comm used intermediate frequencies, broad frequencies, or short-wave frequen If a pure, unmodulated carrier wav desired, the triode section can be p vented from oscillating by means c switch provided on the front panel. modulation switch is mounted in lower right-hand corner of the pa while the other switch, mounted in lower left-hand corner, is the "on- switch in the "A" battery circuit.

SIMPLICITY

A glance at the circuit diagram reveal the simplicity of the unit. F ment current for the 1A7G tube is s plied by means of the small 1.5 volt battery, which fits in a metal bra underneath the chassis of the os lator. The 45 volts for grid No. 2, screen grid, and the plate of the tub supplied by two extra small 22½ volt batteries mounted in a bracket on of the metal chassis. These batte are clearly shown in the photograp the rear of the oscillator.

The coil kit for this oscillator i special unit, which consists of th coils wound on trolitul formers mounted on a sheet of bakelite whic attached to the wave change swi



Looking down on the "works." Batteries, valve, coil unit, condenser, alternator, and other odd parts are clearly shown.

The broadcast and I.F. coils are "pye wound" to ensure a wide frequency range on these two bands. The short-wave coil is a simple single layer winding. The kit used in this oscillator was supplied by Radio Equipment Pty., Ltd., and consists of the three coils ready mounted and directly wired to the wave change switch, so that it is just ready to slip into the oscillator case.

The attenuator potentiometer should be mounted on the front panel in such a way that its shaft is insulated from the panel by means of the bakelite insulating washers which are usually provided with potentiometers for this purpose.

CONSTRUCTION

The first stage in constructing this oscillator is to mount all your components in place, either on the front panel or on the metal bracket which is attached to the front panel. In this way the oscillator can be simply removed from its case, so that battery replacement or any other adjustments are easily carried out. After assembling all the components, the next step is to run a piece of 16 or 18 gauge tinned copper wire as an earth wire to join up all the points shown in the diagram as connecting to earth, excepting the earthed output terminal, the earth end of the attenuator potentiometer, and the earthed end of the 25,000 ohm resistor. To enable the attenuator to operate effectively on the short-wave band, it is advisable to insulate the earthed output terminal from the actual front panel itself and to connect this by means of a piece of insulated hook-up wire directly to the earthed end of the 1000 ohm potentiometer. and then, by means of another piece of insulated hook-up wire, to connect this earthed side of the potentiometer directly to the long brass "wiper" contact which fits in a groove in the shaft of the tuning condenser. The earthed end of the 25,000 ohm resistor should be directly soldered to the earth lug on the 1000 ohm potentiometer.

After completing the earthing, the remainder of the wiring can be carried out in the usual way by means of insulated hook-up wire. The negative filament terminal of the 1A7G tube can be soldered directly to a soldering lug mounted under the nut which holds the tube's socket to the bracket.

The voltage of a new 1.5 volt battery is approximately 1.58 volts. It is not advisable to apply as high a voltage as this to the filament of a tube which is normally used to work with 1.4 volts,

(Continued on Page 39.)

Dial Settings and Switch Positions for most common frequencies used.

C.	Wave Band Switch Pos.	Dial No.	K.C.	Wave Band Switch Pos.	Dial No.	K.C.	Wave Band Switch Pos.	Dial No.	M.C.	Metres	Wave Band Switch Pos.	Dial No
50	1		450	1	144	800	2	76	6	50	3	0
70	1	16	455	1	146	870	2	84	7	42.857	3	31.5
75	1	23.5	460	1	148	950	2	93.5	8	37.5	3	55
0	1	29.5	465	1	150	1020	2	102	9	33.3	3	68.5
0	1	47	470	1	152	1110	2	112	10	30	3	80
0	1	66	480	1	156	1190	2	120.5	11	25.454	3	90
0	1	71	500	2		1270	2	128	12	25	3	102
0	1	75.5	525	2	10	1400	2	136	13	23.075	3	113
0	1	79.5	550	2	20	1500	2	145.5	14	21.428	3	128
5	1	82	600	2	36	1525	2	148	15	20	3	135
0	1	112	610	2	39	1550	2		16	19.375	3	144
0	1	118.5	650	2	50	1575	2		17	17.68	3	
0	1	131	700	2	59	1600	2		18	16.6	3	
7	1	136	740	2	66							

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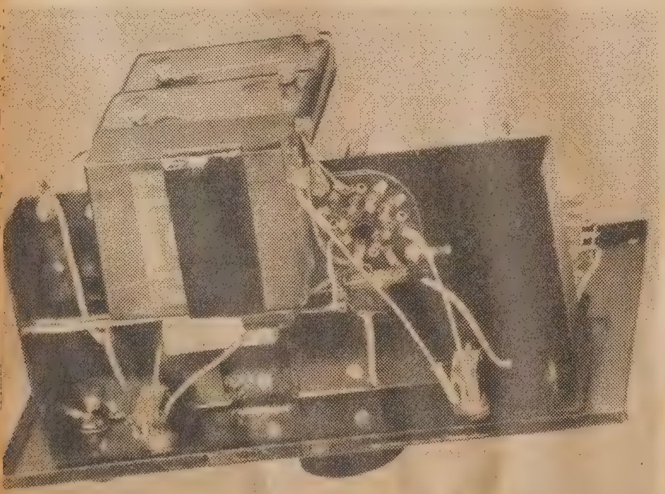
A typical calibration chart which should be approximately correct for each oscillator.



Another view of the oscillator showing the grouping underneath the base.

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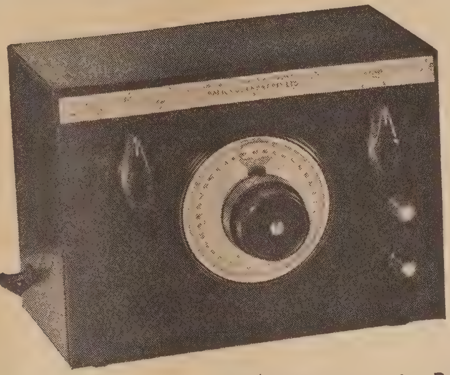

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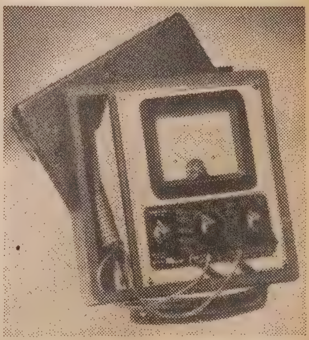

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R.C.S. R.F. Choke. Cat. No. RF2. Price, Retail, 1/-, Post Paid.
R.C.S. Tuning Condenser. Cat. No. CV50. Price, Retail, 9/-, Post Paid.
R.C.S. 2000 Ohms Bias Resistor. Cat. No. R46. Price, Retail, 9d, Post Paid.
R.C.S. .Wire Wound Resistor, 400 Ohms, Cat. No. R30. Price, Retail, 9d, Post Paid.

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Specify R.C.S. Type CV47 100 mmfds. Midget Condensers for tuning. Easy to Gang and results assured. Also—

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1—Audio High Impedance Choke. Type TA1. Retail Price 18/6 each. Post Paid.
1—R.F. Choke. Type RF2. Retail Price 1/-. Post Paid.

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This is the most popular set for beginners and others, too. Little Jim's Coils. Cat. No. K80. Price, 3/6 each, post paid. Little Jim's R.F. Choke, Cat. No. RF2, 1/- each, post paid. Little Jim's Midget Condenser. Cat. No. CV40. Price, 5/3, post paid.

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C.S. new Trolitul Tuning Coils are ghest Q yet produced. Being wound and supported by a combined Trolitul rmer and base, they lend themselves an accuracy and precision hitherto obtainable, resulting in highest effici- cy ever obtained. All coils are suit- le for standard type valves.

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Air Core, 2nd, 460 K.C., sq. can, 3in. x 1⅜in. Cat No IF108. Retail Price, 7/6.
Iron Core, 1st, 469 C., sq. can, 3in. x 1⅜in. Cat. No. 109. Retail Price, 10/6.
n Core, 2nd, 460 K.C., sq. can, 3in. 1⅜in. Cat. No. IF110. Retail Price, 6.
Perm. Tuned, 1st, 460 K.C., square can, 3¾in. x 1⅜in. Cat. No. IF113. Retail Price, 12/6.
Perm. Tuned, 2nd, 460 K.C., square can, 3¾in. x 1⅜in. Cat. No. IF114. Retail Price, 12/6.

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C 1500 to 550 K.C. S/W 16 to 50 Metres.
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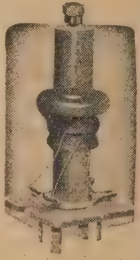
rial, R.F., and Oscillator, 460 K.C. Battery. t. No. DW25. Retail Price, £3/3/-.

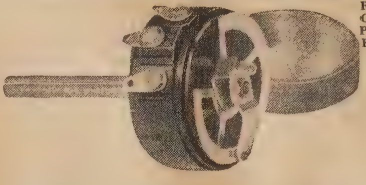
DUAL WAVE COILS

B/C 1500 to 550 K.C. S.W. 16 to 50 Metres.
Air Core Aerial Coil, 460 K.C. Cat. No. G19. Retail Price, 12/6.
Aire Core R.F. Coil, 460 K.C. Cat. No. G20. Retail Price, 12/6.
Air Core Oscillator Coil, 460 K.C. Cat. No. G21. Retail Price, 12/6.

R.C.S. TROLITUL BROADCAST COILS



Air Core Aerial Coils, 460 K.C. Cat. No. E282. Retail Price, 5/9 ea.
Air Core R.F. Coils, 460 K.C. Cat. No. E283. Retail Price, 5/9 ea.
Air Core Oscillator Coils, 460 K.C. Cat. No. E284. Retail Price, 5/9 ea.
Permeability Tuned Aerial Coil, 460 K.C. Cat. No. E279. Retail Price, 7/6 ea.
Permeability Tuned R.F. Coil, 460 K.C. Cat. No. E280. Retail Price, 7/6 ea.
Permeability Tuned Oscillator Coil, 460 K.C. Cat. No. E281. Retail Price, 7/6 ea.



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The R.C.S. Volume Controls are the result of improved and new methods of manufacture, together with alterations in design and final testing. Noiseless, they are constructed so as to cut off all volume.

6	ohm Rheostat	.25 Amp.	Cat. No. PT40	4/6
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20	,, ,,	.25 Amp.	,, ,, PT39	4/6
30	,, ,,	.25 Amp.	,, ,, PT34	4/6
400	,, Potentiometer	50 M/A	,, ,, PT46	4/6
1000	,,	35 M/A	,, ,, PT47	4/6
2500	,, ,,	30 M/A	,, ,, PT49	4/6
5000	,, ,,	30 M/A	,, ,, PT51	4/6
10000	,, ,,	20 M/A	,, ,, PT52	4/6
15000	,, ,,	20 M/A	,, ,, PT49	4/6
20000	,, ,,	15 M/A	,, ,, PT54	6/-

TROLITUL MIDGET CONDENSERS

R.C.S. Midget Condensers are made in two types, using Trolitul supports, thus guaranteeing practically no loss. The 14-plate equals old style 23-plate capacity. The M.C. type may be gauged.

STARS AND M.C. MIDGETS

Max. Cap. mmfd.	Min. Cap. mmfd.	Cap. Plates.	STAR Cat. No.	Price.	MC. Cat. No.	Retail Price.
10	3	2	CV34	3/-	CV41	6/-
15	3	3	CV35	3/3	CV42	6/6
25	3 5	4	CV36	3/6	CV43	7/-
35	4	5	CV37	3/9	CV44	7/6
50	4	7	CV38	4/3	CV45	8/-
70	5	9	CV39	4/9	CV48	8/6
100	6	14	CV40	5/3	CV47	9/-

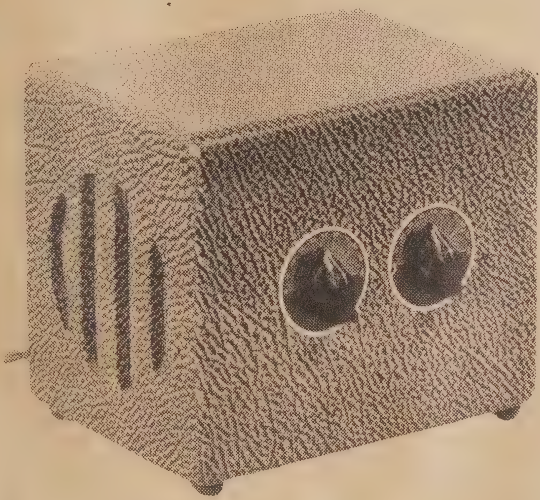
Obtainable from your local dealer, or write direct to:

R.C.S. RADIO
Glebe St., Glebe **PTY., LTD.** 'Phone: MW2405.

We introduce

"TINY TIM"

Brings You Music in Miniature

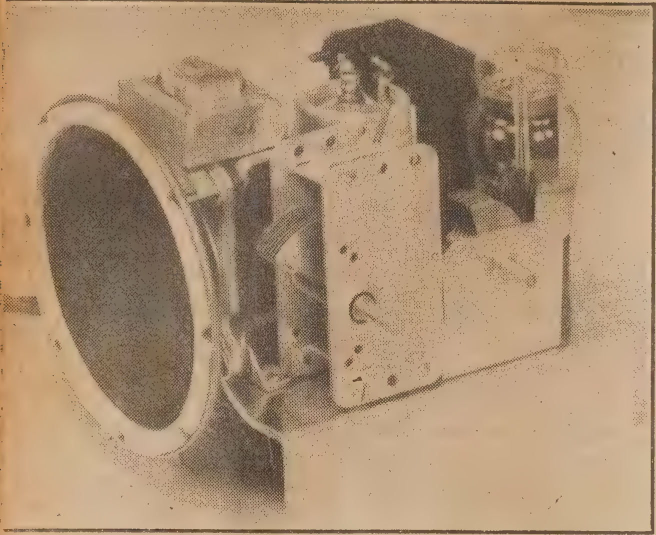


TINY TIM, the tiny little radio set shown here, and described in the following pages, will cost you something like five pounds, or a trifle more. It is complete in a cabinet measuring $7\frac{3}{4}$x$5\frac{3}{4}$x$6\frac{1}{2}$ inches. It won't tune in the world, but it will give you enjoyable programmes from local stations—in most places, from all of them. Tiny Tim has been designed to "give you a tune" at the very lowest price, consistent with reliability and performance. Tim is quite a pleasant voiced little chap, too. You wouldn't think so, by the size of that cabinet, but its special baffle action helps tremendously to give quite nice tone. He has everything it takes to make a "winner" in every sense of the word. Here's good luck to him!

If you already have a console receiver in your home, even though it is a good one, you will find work for Tiny Tim to do. Not until you have experienced the convenience of his portability, and his handy size and shape, will you realise what you might have missed. His mission is a more humble one than that of his big brothers, but he carries it out with the same efficiency and reliability. You can build Tiny Tim yourself—it's very easy and your results are certain.

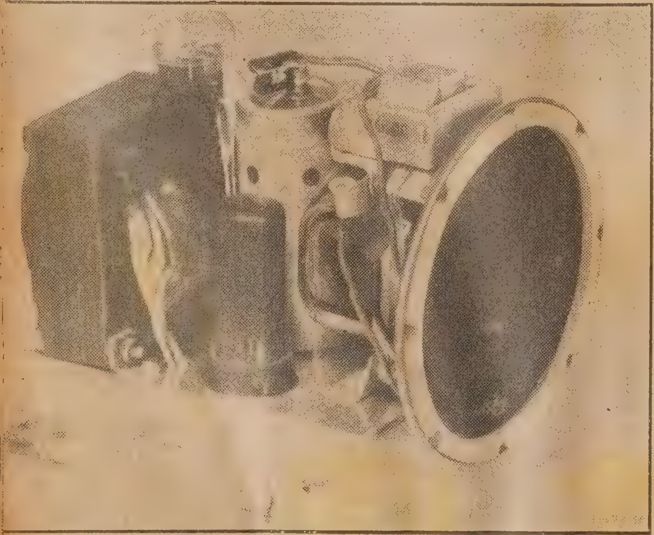
READ ON FOR FULL CONSTRUCTIONAL DETAILS!

IVE POUNDS WILL BUY TINY TIM



he receiver from the front. There is plenty of room for the condenser plates to swing t the side of the loud speaker. The reaction condenser is mounted on a small aluminium pocket bolted to the chassis.

* *



rear view picture shows the set from another angle. Note the grid condenser and ak mounted close to the cap of the 6C8G. The can top is removed to show them. Note also leads from the transformer running down under the base.

TINY TIM has been designed for a definite purpose. It is only a humble set, but, nevertheless, it has a definite place in the radio scheme of things.

The present vogue of small receivers has arisen to meet the demand for baby sets which would combine utility with portability.

One does not desire always to sit in the same room for radio entertainment. There are times when it is desired to listen-in at some distance from the main receiver. For those times, the small set has enabled radio programmes to be enjoyed in every part of the house. In addition, it has brought radio to many homes where a large set would not be practicable or desirable.

The present range of small sets on the market (and this category includes the 4/39, described last month) are truly multum in parvo—much in little. The sets themselves, for all their size, are full-blown superhets., and are able to tune in most of the programmes available in Australia.

As a result, although their price is quite low—round about £10-£12—it is hardly possible to go much below this figure, and at the same time maintain a good standard of performance from such a receiver.

No matter how small a set be made, one can't very well use less than four valves in it, a two-gang condenser, speaker, power transformer, and so on.

Below a certain size, these components don't get any cheaper. In fact, if they were to be made much smaller, unless huge quantities were ordered, the cost would possibly go up, and not down. For, although there is less material used, more care must be taken in manufacture.

AN UNEXPLOITED FIELD

It occurred to us, however, that a radio set which would tune in local stations at good volume, and with a quality equal to the average baby sets, but costing about half the price of present types, might find still another class of buyer.

There are plenty of people who would have a second set in the home, but who jib at paying £10 for the privilege. This, they argue, is a bit too much to pay for the extra convenience.

But, in our view, they would consider £5 a very different story. More than this, they would not be inclined to expect too much from a set costing this trifling sum, realising that something must go to halve the price of a set which is already very cheap.

THUS—TINY TIM

So we began to work out how a set could be built for approximately £5, which would give respectable reception of local stations. Something which would "give them a tune," as an acquaintance put it. Something which could park on the window-sill while shaving, or give sporting results while recovering from a game of tennis, and

NO BIGGER THAN A LUNCH BO

By

JOHN MOYLE

TECHNICAL EDITOR

so on. And, at the same time, would provide the very cheapest form of radio entertainment for many whose purses are a little on the light side.

This is the justification for Tiny Tim's existence.

WHAT HE WILL DO

"Tim" has a very definite list of things he will do.

First of all, he will probably cost you less than £5. He will slip inside a little cabinet, measuring 8 x 7 x 5½ inches, and has only two knobs on the front—one to tune, and one to control volume.

He needs only connection—to the power plug—and will work quite well on a few turns of wire tacked inside the back or round the edge of the cabinet.

He will give you, in most locations, all the local stations, free from interference, and at good volume. Some will be much stronger than others, of course, but at Chatswood we are able to get them all.

He will give you four or five stations just as loudly and well as any other set, almost anywhere. Much depends on where you live. But, in any locality, he will give plenty of entertainment for your £5.

He will give you quite good tone, because of the way the cabinet is made. The original "Tim" has a back on the cabinet, so that the chassis is quite enclosed. The speaker is mounted at one end, and at the other end is a second speaker fret the same size as the first, providing ventilation where it is most needed—at the rectifier valve.

Thus, the sound comes from both ends of the cabinet, is nicely dispersed through the room, and the cabinet gives a back-loading to the speaker, with surprisingly good bass response.

WHAT HE WON'T DO

But he won't separate all the stations, if you live under the shadow of some broadcasting aerial. Being such a simple circuit, selectivity isn't as good as that of a superhet. So, if you are prepared for that one station, and perhaps one or two others, Tim will serve such localities well and faithfully. At Chatswood, a mile or two from 2KY, and in sight of 2SM and 2CH aerials, with 2GB not much further off, separation on a small aerial is easy. This might give you some idea of what to expect. We get more than enough volume f 2SM, 2CH, 2KY, 2GB, 2UW, and with weaker response from 2UE 2FC. Ours might be regarded as a t cal locality.

With an extra five feet of wire tached to the aerial terminal, 2FC cc in with ample volume, and without terference.

Altogether, Tim is about the nea handiest little fellow you have ever in radio sets. Everyone who has h him in operation over the last t weeks has been amazed at obtainin much from a little set no bigger a lunch-basket!

For size, performance, and low cost, Tiny Tim is the handiest little set you have ever seen, or which we have ever described. It will intrigue you, whether you are hardened in the ways of radio, or are about to build it for your first set. In essentials, it is really "Little Jim" grown up, and therefore answers so many requests for a Little Jim circuit for speaker work. If you already have a Little Jim, the 6A6 valve can be used in place of the 6C8G, so that nearly all "Jim's" components will be useful.

THE CIRCUIT

The circuit, as you will imagin very simple. In it we go back to fundamental hook-up which has with us for years—the old reaction tector, followed by audio stages dr a loud speaker.

However, modern developments enabled us to improve on those ea results, so that there is little fu comparison between the two sets- old and the new.

The first valve is the twin-triode —6C8G. Having two separate cath this valve is really two triodes in envelope.

The first of these triodes, which its grid connected to the cap of valve, is used as the regener detector.

A special Trolitul tuning coil has developed for Tim.

To give the best volume and select it has two aerial connections, so you can choose whichever works better. As the aerial is only a few of wire in the lid, the reaction is likely to cause interference with sets, as would be the case if the were made to oscillate when conne to a big aerial.

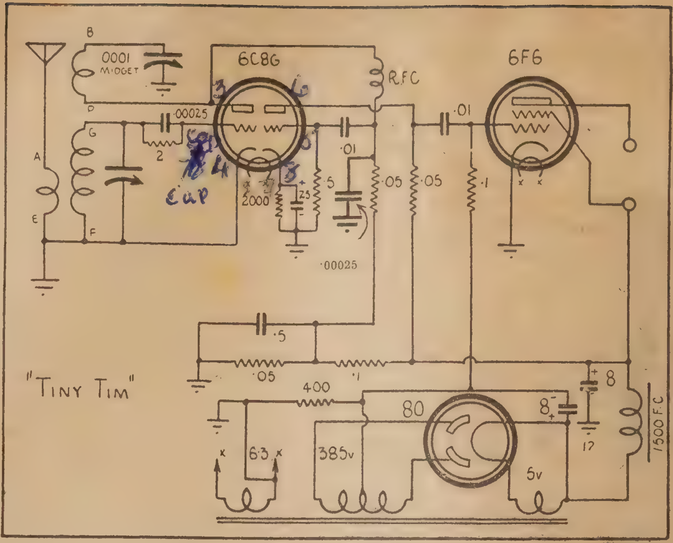
The second half of the 6C8G is as the first audio stage. It has an ar fication factor of 8, and gives en step-up in a resistance-coupled ci to drive the output valve, a stan A.C. pentode.

We used a 6F6 here mainly becau is smaller in size than the 6F6G or 42. Either of these valves ma squeezed into the chassis, if you sh have one on hand.

The detector section of the 6C8C quires only a low voltage of abou

PARTS LIST

1 chassis, 5¼ x 6 x 1½ inches.
1 single-gang condenser.
1 .0001 mfds. midget condenser.
1 power transformer, 325-0-325 v. at 40 mills., 5v. and 6.3v. windings.
1 midget can-type 8 mfds. electrolytic (insulated).
1 tubular 8 mfds. electrolytic.
1 Reinartz trolitul coil.
1 2 meg. resistor—½ watt.
1 .5 meg. resistor—½ watt.
2 .1 meg. resistors—½ watt.
3 .05 meg. resistors—½ watt.
1 2000 ohms bias resistor.
1 400 ohms W.W. resistor.
1 small 25 mfds. electrolytic.
2 .00025 mfds. mica condensers.
2 .01 tubular condensers.
1 .5 mfds. tubular condenser.
1 R.F. choke.
1 valve can.
Sockets: 2 octal, 1 4-pin.
Valves: 6C8G, 6F6, 80.
Speaker: 5-inch 1500 ohms, field matched to pentode.



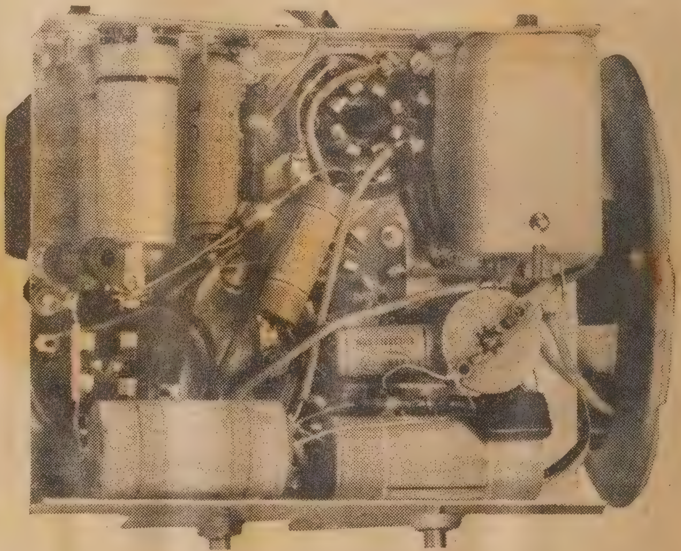
The circuit is particularly simple. There is nothing here at all difficult to follow.

volts. This is obtained from the junction of two resistors—a .1 meg. and a 50,000 ohms, connected across the high tension. A .5 mfds. tubular condenser is used from this point, as a bypass to the chassis. An R.F. choke is also advisable in the plate circuit, with a .00025 mfds. condenser bypassing it as shown.

THE SPEAKER

The speaker is a 5 inch type, as used in midget sets, with a 1500 ohms field coil. It is, of course, matched to the 6F6. Both Rola and Amplion make suitable speakers, and either should fit into the chassis.

The power transformer was specially made by Henderson for this set, and is the same type as was used in the 4/39. Incidentally, this transformer is rated at 325 volts per side, and not 385v. as with the standard types. This is plenty of voltage, however, for the receiver, as we don't want, nor could we use, the full output from the 6F6.



Under the chassis. Top left are insulated 8 mfds Electrolytic and 400 ohms bias resistor. Next to it, the 25mfds electrolytic and 2000 ohm resistor. The coil is at top right. R.F. choke below it. Lower right is 8 mfds tubular, and next to it, the .5m tubular. You will have an extra ½-inch under your chassis.

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and we can supply in five colors.
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Time — all the Time
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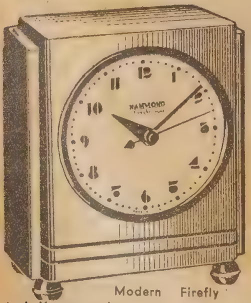

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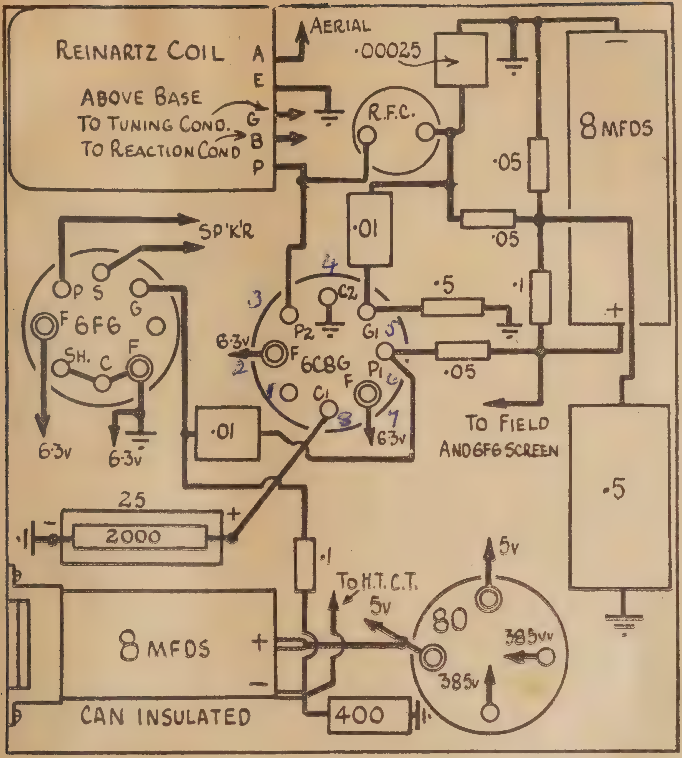

The wiring diagram.

CONDENSERS

The tuning condenser is an ordinary single section type, available in several makes. We took the precaution of seeing that any of these will fit on the chassis, and have left enough room in our layout. The position for the shaft is marked on the layout diagram, and all you need do is to see that it is in the right spot.

The reaction condenser is a standard 100 mmfds midget, ours being one of the type sold by R.C.S. and Radiokes, who also make a suitable power transformer, by the way. You will notice that it has a Trolitul end-plate.

SMALL PARTS

In order to save space under the chassis we have used the smallest small parts obtainable.

In the case of the resistors, these are all ½-watt types. The filter condensers are of the midget type now obtainable, still with 8 mfds. of capacity and 525 volts peak rating—ample for our purpose.

One of these is a can type with an insulated mounting foot for the back-bias circuit, and the other may be a plain tubular type, obtainable in several makes.

In the wiring diagram we have drawn these components a little on the small side to avoid complications in the drawing. Their exact position doesn't matter at all, as long as the connecting leads don't short-circuit each other, and the connections are made correctly. Neither of these conditions is very hard to observe.

LAYOUT

We have drawn a full-sized diagram showing how the parts are laid out above the chassis, and we suggest you study it carefully before making the set. It will give you the exact centres for valve socket holes, etc., which hold good for the original set. We have drawn the chassis one-quarter inch deeper than the one in the photographs, to allow room for any of the tuning condensers available. This is allowed for in this diagram.

When all your parts are ready, lay them out on this diagram, to make sure that they all fit as they should. We have tried to get the measurements as accurately as possible.

The lead from the tuning condenser to the coil runs through the chassis by means of a hole drilled right underneath it, and therefore unshowable on the diagram. The same holds good for the reaction condenser. These leads are indicated by arrows on the wiring diagram.

POWER TRANSFORMER

The power transformer has leads for connection to the set. Two holes are drilled in the chassis just above the 25 mfds. condenser and 2000 ohms resistor, to allow these leads to pass through. The

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RATINGS & PRICE

3 WATT TYPE AA.

⅞in. x 5-16in. at 160 degrees Centigrade.

Ohms	Max. M.A.	List Price
100	173	1/3
150	141	1/3
200	122	1/3
250	110	1/3
300	100	1/3
500	78	1/3
600	71	1/3
750	63	1/3
1,000	55	1/3
2,500	35	1/3
3,000	31	1/3
3,500	29	1/3

5 WATT TYPE AB.

1¾in. v 5-16in. 160 degrees Cgrade.

Ohms	Max. M.A.
100	225
150	182
200	158
250	142
300	129
500	100
600	91
750	82
1,000	71
5.000	[illegible]
10,000	22

20 WATT TYPE DG.

2in. x 9-16in.

Ohms	M.A.	Price
	Max.	List
100	447	3/6
150	365	3/6
200	316	3/6
250	252	3/6
350	238	
500	200	
750	163	
1,000	141	
5,000	63	
7,500	51	
10,000	43	
15,000	36	
[illegible]	30	

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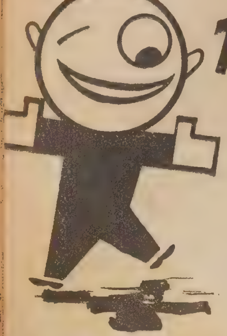

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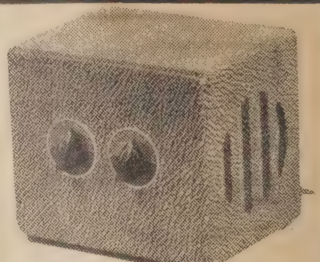

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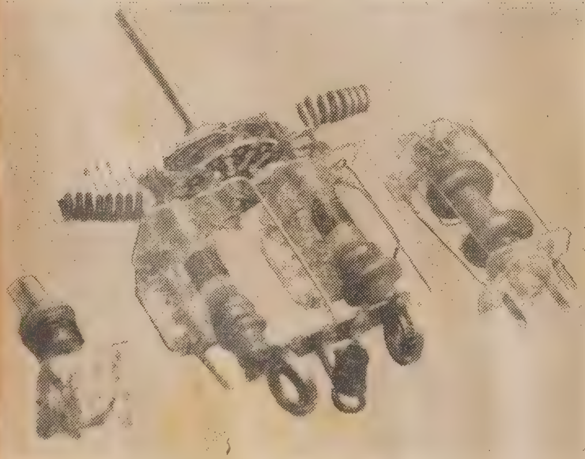

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Type DAU-I . . . . List Price, 25/-
Type KDA Trolitul Coil Kit, 2 Air Core I.F.'s, 1 Dual Wave Unit. . . . . List Price, 36/-
Type KDI Trolitul Coil Kit, 2 Iron Core I.F.'s, 1 Dual Wave Unit. . . . . List Price, 45/-
RADIOKES Coil units or kits can be obtained for 13 to 36 metres. Please specify when ordering.

Radiokes Trolitul Midget Condensers

As Used by the Technical Editor.

Radiokes Midget Condensers, 14-plate type, equals old-style 23-plate capacity. The M.C.T. Type may be ganged.

Max. Cap. mmfds.	Min. Cap. mmfds.	Cap. plts	List Prices:
10	3	2	6/-
15	3	3	6/6
25	3.5	4	7/-
35	4	5	7/6
50	4	7	8/-
70	5	9	8/6
100	6	14	9/-

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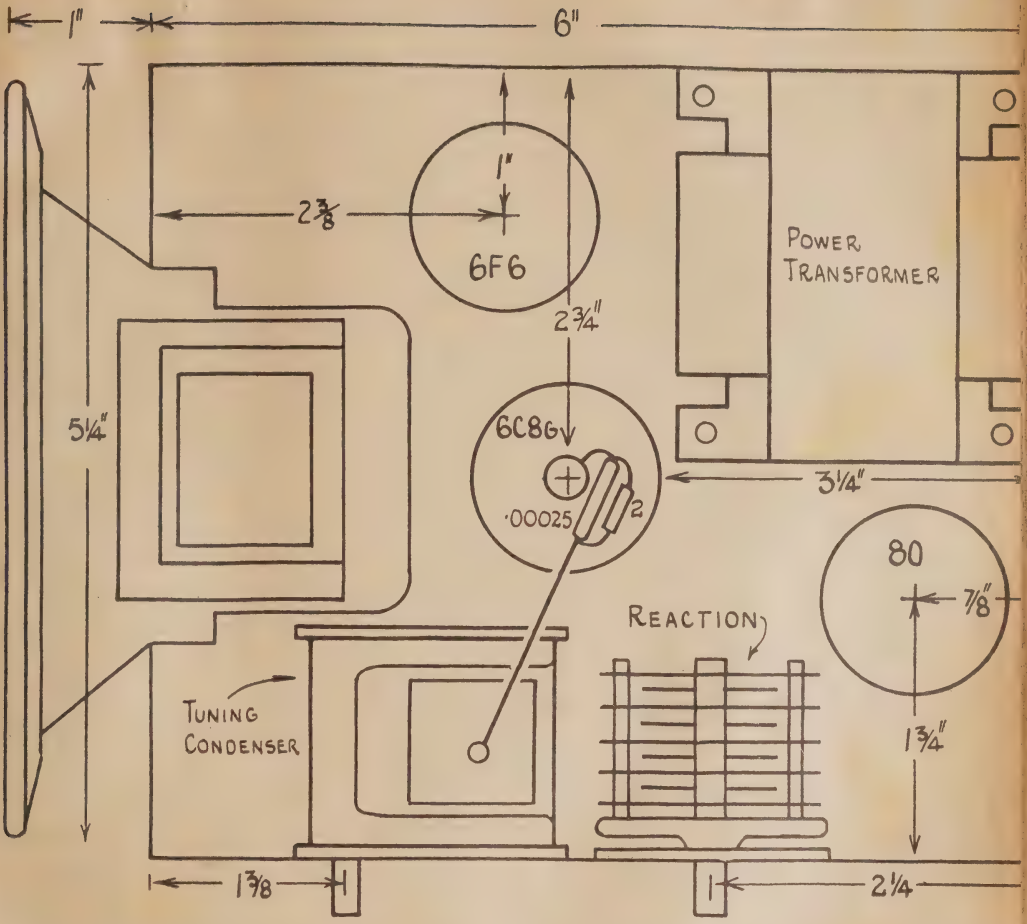


Here is a full-sized drawing of the chassis from above, showing where and how all the parts are mounted. When you get all your parts together, lay them out on the chassis as shown here, to check their positions for clearance etc., before cutting any holes.

black leads are the 5 volt winding, and the yellow leads are the 6.3 volt winding. These are spaghetti covered. Two green leads of hook-up wire lead to the 325 volt A.C. connections, and the black one is the centre tap. The A.C. leads are both red in color.

The tuning coil is mounted to the back of the chassis by the little nut which holds the coil unit in the can. It rests hard up against the base, and no other mount is required.

The speaker is also connected into the circuit by the leads supplied with it. The input leads are connected to the 6F6 plate and screen, and the field leads are connected to the rectifier filament, and the 6F6 screen—the latter thus has two connections.

CABINET

We have had a special little cabinet made for this set. It is a very simple affair, and has two holes in the front for the condenser spindles. A couple of easily-obtained scales, and pointers, are all one requires to finish it off. The local stations are so easily recognised that a more elaborate dial isn't required, particularly as it would take up so much room.

Better ventilation would be obtained if the cabinet were left without a back. We have been using the set with a back screwed on, and the cabinet does not appear to get warmer than is desirable. You can please yourself about this.

Our cabinet, as usual, was made by Western, who are specialists in this type of work.

AERIAL

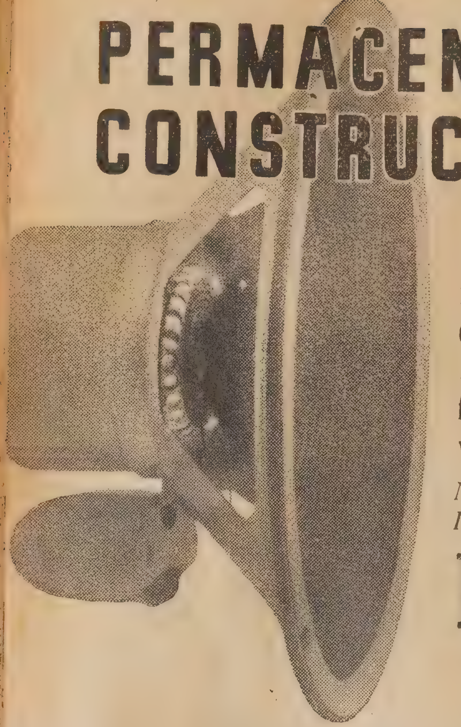
For an aerial, we tacked four turns of ordinary coil-winding wire, about 24 gauge, round the back of the cabinet. This was enough for practically any station. An aerial terminal or socket may be included at the back, for connection to a few feet of aerial if required. Do not use a big outdoor aerial, as if you do you won't separate the stations unless some miles out of the

In country areas, where selecti isn't important, a larger aerial can used. Quite a few distant stations sh then be heard at night.

You can experiment with the different aerial connections, accor to your locality. We used the lug nection for the "short aerial."

Tuning the set consists of rotating tuning dial and adjusting reaction best volume. Too much reaction make the set oscillate, and you won't much when it is in this condition. control is fairly sharp, so go easy wi for a start.

The rest of the story is told in pictures and the diagrams. We welc inquiries on this set, and will do our to answer them in the first avail issue of the paper, or in "Wir Weekly," if they are required before time.



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ious, because of its simplicity, this method of construction is achieved by use of high precision tools, dies and It is so accurate that centering de- with their attendant screws, bolts and os are as unnecessary and as out of as reaction controls and rheostats. acentric is the only method of con- ion that maintains the vital diaphragm bly in perfect alignment under all con- s of service. Combining permacentric construction with other outstanding developments—the isocore transformer, positive dustproof and acoustic filter, wide range reproduction and ultra high sensitivity—Rola now releases the best speakers that have ever been developed in the history of sound reproduction.

The recently announced K12 is far in advance of any other speaker in its field and is indisputably the best speaker investment offering to-day.

Permacentric construction is now available on all 12in. and 10in. Rola speakers as well as on the 8in. permanent magnet types.

is Month's Recommendations:

FOR INY TIM

Use the Rola F4 electro dynamic speaker for your "Tiny Tim," described in this issue. Rola Speakers are designed to give the best quality and output, whether your set is large or small.

The F4 model as specified for "Tiny Tim" features Permacentric construction, and all other modern speaker refinements.
RETAIL PRICE 23/-

Write to the New South Wales distributors for full price list.

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The Boulevard and Park Avenue, Richmond, E.1., Victoria.
116 Clarence Street, Sydney, N.S.W.

BIG AMATEUR CONVENTION

WILL BE HELD AT NEWCASTLE

For some time past the N.S.W. Division of the W.I.A. has been considering the possibility of arranging conventions for country amateurs. The discussions have now materialised, and Newcastle, on September 9th and 10th, will be the scene of the first of these conventions.

THE majority of the organisation of the show will be done in Newcastle by a committee comprising VK2KB chairman, and VK2ZC, VK2KZ, VK2CS, and VK2YL. They are responsible for the very satisfactory programme.

Visitors will assemble outside the Newcastle Great Northern Hotel, at 6.30 p.m., and programme is as follows:—

Saturday, September 9:

7 p.m., dinner at Great Northern Hotel; 8. 45 p.m., business session.

Sunday, September 10:

10.30 a.m., assemble for trip to Toronto; 1 p.m., luncheon; 2 p.m., contests; 4.30 p.m., tea and return to Newcastle.

MANY PRIZES

A number of trade firms have been kind enough to present apparatus for prizes to the value of £20. The competitions during Sunday afternoon, will comprise three sections: Morse code, technical, and social, giving everyone an equal chance of winning something.

Apparatus donated for prizes is as follows: 5 receiving valves from Philips Lamps, Ltd., 100 mmf. Raymart Transmitting condenser from John Martin, Ltd.; open order from Prices Radio, and box of gear from Mr. Don Knock.

"Radio and Hobbies" will also contribute to the prize list.

The list is by no means complete, and further donations have been promised.

ACCOMMODATION

Non-members of the Institute are welcome, and the inclusive ticket for competition, entrance, dinner and trip, is 10/6.

Accommodation for Saturday night is extra, and has been arranged by the committee at 6/- per head.

To date, 50 amateurs have stated they will be in attendance. If you make application by September 2, you will have a chance of winning a valuable prize in a ballot, so book early.

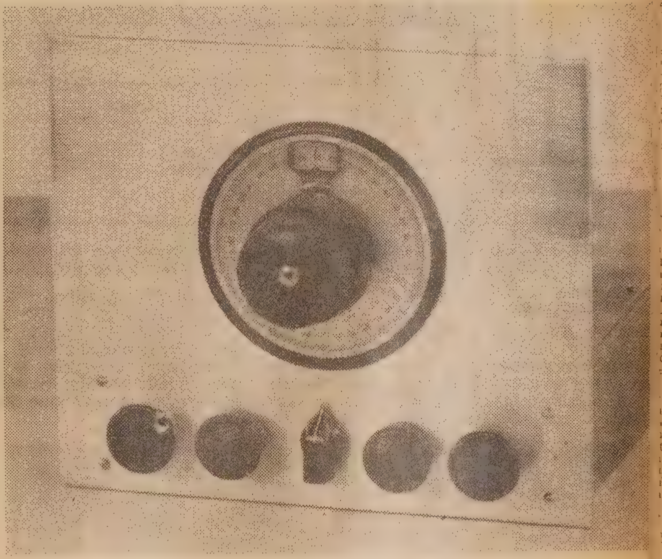
Get in touch with 2ZC, 2KZ, or 2YL, in the country, or 2TI or 2HZ in the city. Write to W.I.A., Box 1734JJ, G.P.O., Sydney, for fullest information.

Trains leave Sydney up till 2.15 p.m., and those going by car should assemble at the G.P.O., at 1.45 p.m.

Come along and meet the country gang and if you are lucky or brainy, win one of the many valuable prizes!

A STANDARD T.R.F. RECEIVER
for short wave reception

Here is a set many have been looking for—a standard T.R.F. circuit suitable for all standard types of valves. The layout is easy to follow, and the wiring is of the simplest. It can be used by the short-wave listener, or adapted for amateur requirements. We have described it for use with 1.4 volt valves, although other types may be used with suitable slight changes as required. It gives excellent sensitivity, good control, and excellent volume for phones or speaker.



A front view. Any good panel type of dial will be suitable. Make the front pa of 16 gauge aluminium for maximum rigidity.

IN this article, we intend to describe a four valve short wave receiver, which may be regarded as a typical example of how to build such a set for battery operation.

It is not the only way one can build it—there are as many ideas on layout and general design, as there are people to work them out.

It is, however, a set which we have carefully tested, and which will behave itself very well if carefully constructed.

As you will see, it is a standard type —there are no trick circuits or unusual features to wrinkle your brow. That such a set will be welcomed we know by the inquiries we have received from time to time.

This article will, no doubt, provide the answer to many of your queries.

FOR ANY VALVES

Although in the circuit given here, we have used the new 1.4 volt battery valves, there is no need to use them if you have some 2-volt types on hand. It will work equally well with such valves —in fact, results will probably be a little bit better, providing suitable voltages are used. Plates 135 volts maximum, and screens, 90 volts.

However, the 1.4 volt types easily have the palm when it comes to economy, and will give their results with much less battery power than the 2 volt types.

For this reason, we have used them. But again, we stress the point that similar types of valves in other filament voltages can be used. You may have some of the older 4 volt valves which will serve the purpose.

ADAPTABLE FOR A.C.

The same general circuit can also be used for an A.C. set. There will, of course, be a few alterations to the wiring to allow for the different construction of these valves, but these are not many or serious. Anyone with a slight knowledge of radio can carry them out.

A suitable power supply will also be necessary with such an A.C. version.

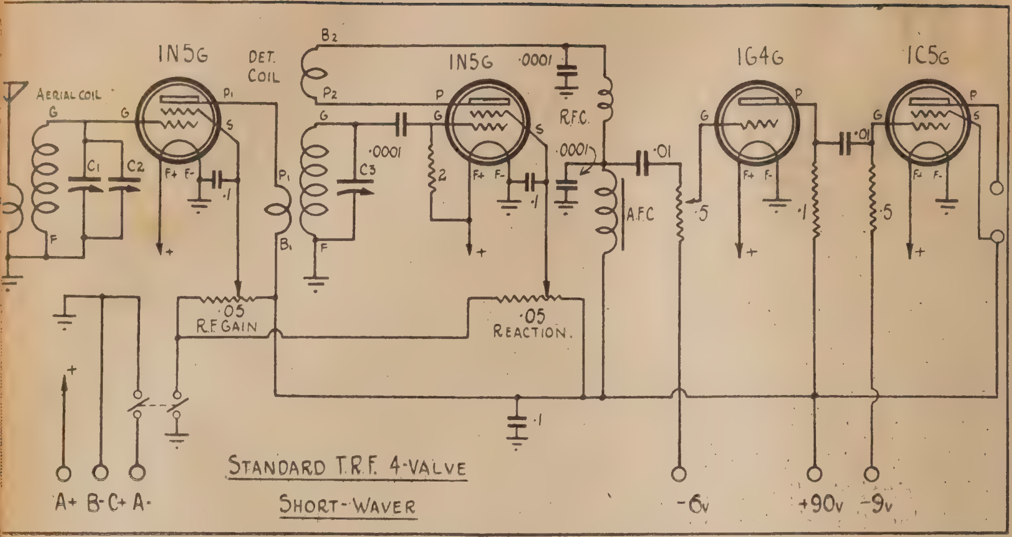
For the benefit of those who would like to build it up for A.C. opera we will try to include in the Oc number of "Radio and Hobbies," the circuit, and wiring diagram, showing it is done.

This isn't a promise, because s thing may turn up in the mean which might have a better clai space. But we will do our best.

T.R.F. CHARACTERISTICS

The controversy about T.R.F. sets superhets. is almost decided now favor of the latter. But there are many people who are fond of the T circuit, and who would like to ha shot at building it.

A T.R.F. set hasn't the selectivit the superhet, although as far as sitivity goes, this receiver is quite It is also easier to build because are less parts, and less adjustments ly to be critical. To build a 4- battery superhet. one would need to a fair amount of time and troub make it really "step out." On grounds, there is justification for cribing this receiver.



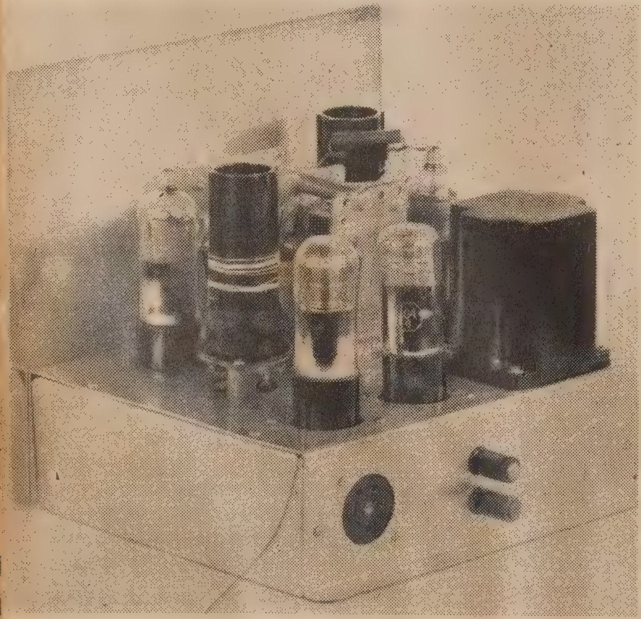
e is the circuit showing values for the 1.4 volt valves. The output valve draws a low current, so that a good pair of magnetic phones may be connected directly in circuit. Overbiassing this valve will still further reduce the drain.

CIRCUIT

e circuit is fairly straightforward, as we have set it out here, is shown ble for the short-wave listener. By we mean that it will cover on one of coils a band from 16 metres to etres.

This is particularly convenient from the listener's point of view, because he can get the 16, 19, 20, 25, 31, and 40 metre bands without changing coils.

From the amateur's view-point, it is also a suitable circuit, provided smaller tuning condensers are used to gain the necessary bandspread.



set from the rear. R.F. amplifier and aerial coil are seen in the foreground. tery socket and output terminals are shown. Aerial and earth terminals may be nted at the side. The R.F. amplifier grid cap connects to the grid terminal of the tuning coil. Detector grid condenser to top front section of the gang.

The actual wiring will remain the same —only the tuning condenser capacity will be altered. More of this later on.

THE R.F. STAGE

The set includes an R.F. stage first of all for the better sensitivity it allows, for the better selectivity also, and because it allows the detector to be freed from loading effects of the aerial, which often make reaction difficult.

The load on the detector imposed by the R.F. valve is fairly constant—much more so than is the load of the aerial. Consequently, by careful adjustment of the coils, we can get better detector efficiency than if the aerial were fed directly into its tuned circuit.

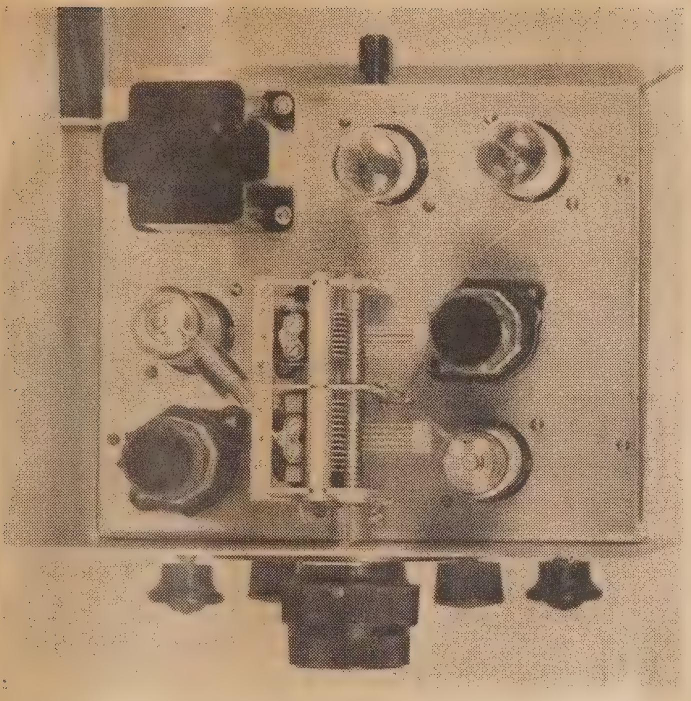
The R.F. valve has a variable screen control to vary its sensitivity. This is very handy, particularly when a strong signal is received which otherwise might tend to overload the receiver. As a rule, it can be left turned well on, if not full on.

The 1N5G is a zero bias valve—in other words it does not require "C" bias when operated full out. Also it works with 90 volts maximum on plate and screen —a very convenient characteristic.

It would be quite permissible here to use a variable-mu type of valve, such as the new 1P5G, and to vary its gain by varying the bias. To do this, a potentiometer would be required across the C battery. This is a rather more awkward method, however, although possibly a little more effective. It also calls for a few more parts.

TRANSFORMER COUPLING

The R.F. amplifier is transformer coupled to the detector valve. This method gives good gain, and is flexible, in that experiment with the plate winding will allow the load on the detector to be varied, with a consequent adjust-



This photo shows connections above the base, also layout details. The coil sockets are raised about half an inch from the chassis with spacing pieces. Note the cut down tuning gang. Earthing pieces are connected to the chassis.

ment to get best reaction effects. Too close coupling will have the same effect as a heavily coupled aerial—the need to force reaction with possible threshhold howl and fierce control.

The detector valve is another 1N5G. It has a screen control of reaction—a potentiometer across the B supply allows a variation of screen voltage for this purpose.

Grid-leak detection has been used, as being convenient and sensitive.

GRID-LEAK CONNECTION

A point arises here, owing to the grid of the valve, and of all other screen-grid types, being connected to the cap. It is desirable in the interests of highest sensitivity, to return the grid leak to the positive side of the filament circuit.

Unfortunately, it is not practicable to connect the positive side of the filament to the chassis, and thus get the effect with a leak straight across the grid condenser. Apart from the fact that a positive bias of 1.4 volts would thus be applied to all valves, including the R.F. amplifier, the suppressors in the pentodes are tied internally to the negative side of the filament, which must, therefore, be earthed.

The set will work quite well with the grid leak across the condenser (and thus connected to A negative, via the tuning coil) but it might be found a good idea to put up with a slightly awkward connection, and run the return down the side of the valve to the positive side of the filament.

There is nothing near this grid leak to cause complications, and even if the valve is placed under a can, which is optional, the use of a moulded bakelite resistor will prevent any short-circuits or things of that nature.

We have shown this connection in this circuit, although the photograph shows the set with the leak connected across the grid condenser. Try both methods—it won't be hard to do.

The only alternative would have been to use a triode detector valve, with a loss in gain. Also transformer coupling should not be used, if you have a suitable valve on hand. The grid being connected to one of the socket pins, the connection for the grid leak would then be easy.

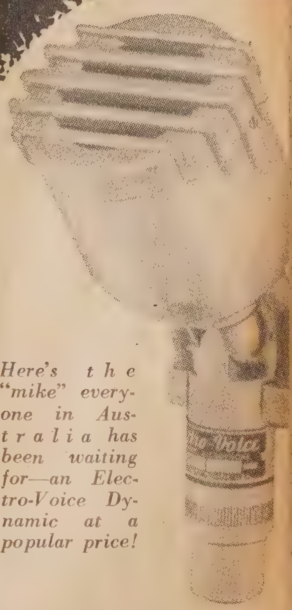
AUDIO AMPLIFIER

The audio amplifier uses a newly-released triode valve of the 1.4-volt series—the 1G4G. This is a medium-mu valve, having a factor of 8, making it roughly equivalent to the 30. It requires a bias of 6 volts.

This valve is resistance coupled to the output pentode, which we have shown as the 1C5G. This is the larger of the two available pentodes, but we find it gives better results than the 1A5G, and has more than twice the output. It requires 9 volts bias.

A good permagnetic speaker allows full strength to be obtained from all the main overseas stations without difficulty.

A new
HIGH FIDELITY
DYNAMIC
MIK
The Electro-Voice **"620**



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The enthusiastic reception given the " by studio, public address and commun tion engineers throughout the world guarantee of its quality of response overall efficiency.

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Please send me leaflet describing the " and "610" Electro-Voice and containing specifications.

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OLUME CONTROL

The audio volume control is placed the grid circuit of the 1G4G. This s been done because we have found s danger of audio instability than if first valve is allowed to run at full n all the time. Sometimes such in- bility is found in a set having such high amplification, for the choke pled detector has a big lift on its n account.

ncidentally, shielding the leads to the ume control is a wise precaution, any- w, with a set of this nature, in case ne coupling should take place in the ring. Use ordinary shielded braid, with the braid securely soldered to the chassis, preferably at both ends.

LAYOUT

Our layout necessitates only one lead longer than might be desired, and that is the plate lead from the R.F. amplifier. As this may be run clear of any other important wires, it is better to do this, than to have long reaction leads, which may otherwise be necessary.

However you lay out the set, you will find some "long" leads required, and it's just a matter of your own ideas on the subject. No sign of instability was noted due to this plate lead running across the chassis. Naturally, to have feedback, there must be two wires in the picture. If you keep everything well away from this plate lead, there will be nothing for it to feed back into!

TUNING CONDENSER

Several alternatives are available for the tuning condenser. We have used a simple one, in order to get the coverage of 16-40 metres on one coil.

We obtained a standard broadcast gang, which in all makes these days has about .00038 mfds. capacity.

By removing two-thirds of the plates on each rotor, this capacity is reduced to one third, or .000126, if you like to be accurate. This is just right to get the coverage mentioned.

It may be possible to buy such gangs ready made. These may measure .00015 mfds.—if so, it simply means that you will get higher than 40 metres, and the bands will be a bit closer together.

If you use some of the excellent .0001 (100 mmfds.) midget condensers, which are available in several makes, and connect two together, gang fashion, you will be quite all right, except that your coverage will be restricted to about 16-35 metres or thereabouts.

PARTS LIST

1 chassis, 8½in. x 7in. x 2½in.
1 2-gang condenser, 125 mmfds, sections, or 2 100 m.mfds. midgets—see text.
1 25 mmfds. midget condenser.
1 vernier tuning dial.
1 audio high impedence choke.
1 2 meg. resistor.
2 50,000 ohms potentiometers.
1 .5 meg. potentiometer.
1 .5 meg. resistor.
1 .05 meg. resistor.
1 .5 mfds. tubular condenser.
4 .1 mfds. tubular condensers.
3 .0001 mfds. condensers.
1 R.F choke.
1 double-pole single-throw switch.
Sockets: 4 octal, 2 6-pin, 1 5-pin.
Valves: 2 R.F. pentodes, 1 triode, 1 output pentode in 1.4 volt or 2 volt types, as desired.
Batteries—For 2 volt valves:
  3 45-volt B batteries.
  1 2-volt accumulator.
 For 1.4-volt valves:
  2 45-volt B batteries.
  1 1.4-volt A battery.
Speaker: Permagnetic matched to pentode.
Six-pin coil formers, wire for coils, hook-up wire, 5 knobs, nuts, bolts, &c.

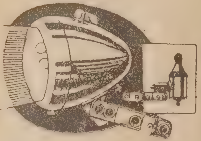
CUTTING THE GANG

It is quite simple to cut down the plates of a standard gang. First remove the rotor, by taking out the earthing strips, and unscrewing the lock-nut at the rear of the condenser. Be careful you don't lose the ball-bearing at the front end when you take out the rotor.

Now count off the plates to be removed. It doesn't matter whether these come from one end, or from both ends.

MURDOCH'S

GENERATOR SPECIALS

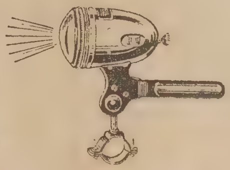


37/6 Set
For as Low as
25/-

"POWER MODEL GENERATOR LIGHTING SET. Super power 3 watt generator. Anti-glare glass. Emergency built-in battery. 2 Lamps in headlight, 5 position change-over switch for battery or dynamo lighting on either lamp in headlight, tail lamp and connections.

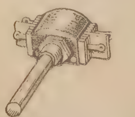
HEADLAMP
(With built-in Battery)
7/6

HEAD LAMP ONLY. Anti-glare glass. Two lamps in headlight 5 position switch to light either lamp, external connection for dynamo. (Illustration shows only 1 globe, but 2 are fitted similar to the 25/- model.)



Aero Spot Light
HEADLAMPS
6/-

Made as illustrated above with extended handle and turns everywhere. Streamlined. Connect to your existing generator.

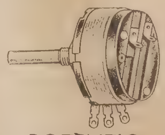


MINIATURE
ROTARY SWITCH

One hole fixing. Made in U.S.A. by ARROW. Double pole, double throw, 4/-; Single pole, double throw, 2/6; Two-way change-over, 2/6.

MINIATURE
TOGGLE SWITCH

Reliable and efficient, with one hole fixing. Double pole, double throw, 3/3; Double pole, single throw, 2/3; Single pole, double throw, 2/6.



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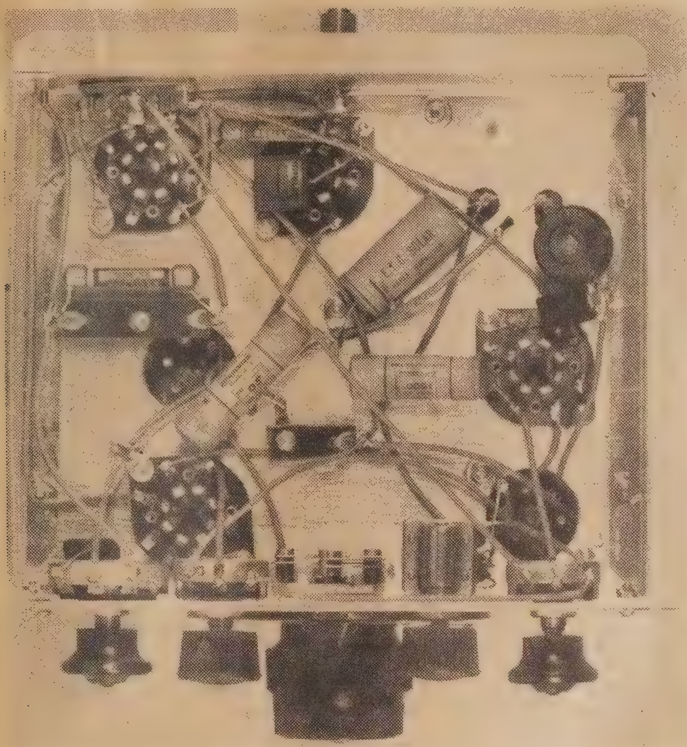
Best noiseless carbon. Smooth action. 500,000; 250,000; 100,000; 50,000, 3/-.
Wire-wound potentiometers, 400, 1000, 2500, 5000, 10,000, 2/6.
Potentiometers with switch, 500,000; 5/-.

We pay freight. Kindly write to Desk "C69."

MURDOCH'S LTD., PARK ST., SYDNEY "Where the good hats are"

UNDERNEATH THE CHASSIS



This is a particularly clear photograph of the under-chassis wiring and layout. Very few components are required. Note the by-pass condensers all earthed at the same point. To this point above the chassis, are connected the earthing strips of the gang.

First of all, carefully cut through the binding piece at the tips of the plates, with a hack-saw blade. Take care over this, lest you distort the plates, Once having made the cuts, the unwanted plates may be pulled out with pliers.

The condenser is now reassembled, and the back bearing adjusted tight enough for easy movement without binding. The earthing pieces are now reinserted, and the job is done.

There is no need to remove any of the fixed plates. They don't come into the picture, and its almost impossible without spoiling the condenser.

Suitable two-gang condensers are available quite cheaply.

THE TRIMMER

In order to keep the two circuits fully in line, a trimming condenser is wired across the R.F. section. Reaction always alters the tuning a little and this hand-trimmer is a good thing to have, and it also compensates for any little differences in the coils.

Its adjustment is not frightfully critical, as the R.F. stage isn't very sharply tuned—not as sharp as the detector. If you allow one or two turns less on the R.F. coil, you can then always make up the extra capacity with the hand-trimmer, whilst preserving the convenience of almost perfect tracking of both stages.

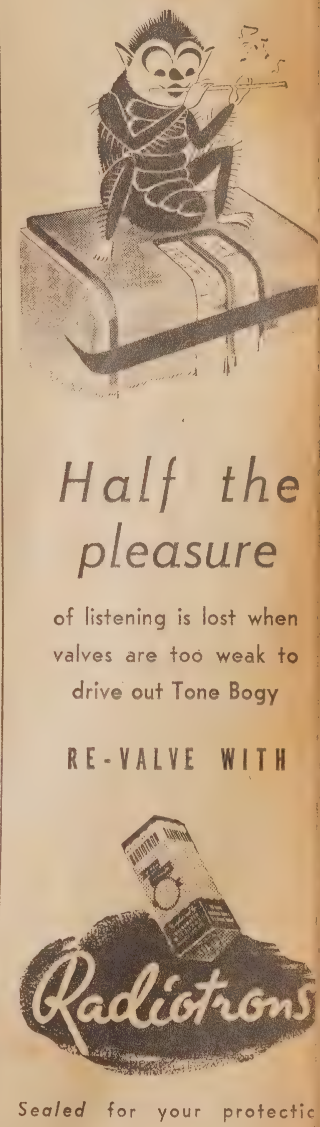
The only other alternative would be to use two tuning condensers separately controlled, and this is an old-fashioned awkward idea.

THE SWITCH

The A battery switch has two sections, independent of each other. One of these cuts the A battery when the set is not in use. The other breaks the earth connection for the two potentiometers, to avoid having them connected across the B batteries all the time. The current through them is small, but would soon flatten the batteries if left there day and night. All this is standard practice.

BATTERIES

The 1.4 volt valves should never under any circumstances, be operated with more than 90 volts high tension. This is directly contrary to the makers' ratings, so don't be tempted to do it. Similarly, the A battery voltage should never be allowed to be higher than 1.58 volts.



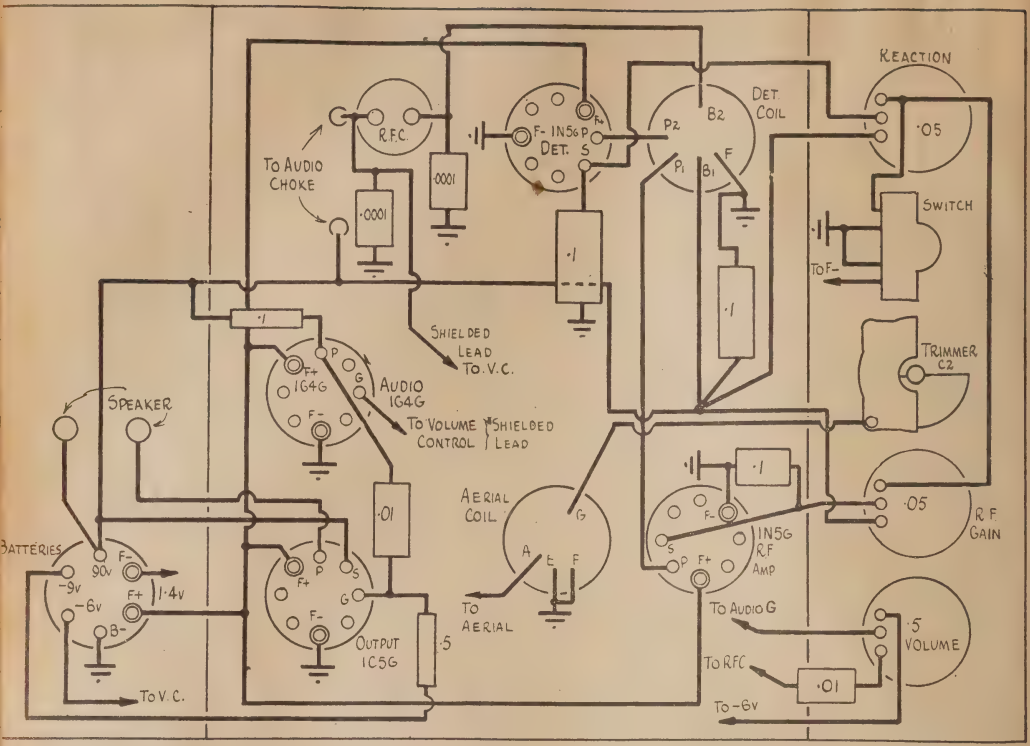
Half the pleasure

of listening is lost when valves are too weak to drive out Tone Bogy

RE-VALVE WITH

Radiotrons

Sealed for your protectic



The wiring diagram. This is drawn to scale and will therefore assist you in measuring the layout for your chassis.

With a fresh A battery, the voltage ll probably be higher than this by a action, but it is enough to render e makers' guarantee void. Therefore, y a .25 ohm resistor, which is available at any dealers, and wire it in series th one of the battery leads while the battery is new. When it has been use for some weeks, and the initial ltage is somewhere near the 1.5 volt ark, this resistor can be removed, but ve it there until you have reason to ink your A battery is getting low.

Also, a small torch bulb, of the .06 ıp variety, connected in series with e negative B battery lead, is a good otection against possible accidents which might cause a short-circuited B battery or perhaps blown filaments.

The set will work a long time with a pair of light duty 45 volt B batteries, and a standard 1.5 volt dry cell. Longer life, of course, will be obtained from larger batteries, which are easily available.

THE SPEAKER

Any good permagnetic speaker will do —modern types are very sensitive. Don't get a very small one, as the 8-inch types are much more sensitive and will give better volume and tone. The input should be matched to the 1C5G, or which ever type of output pentode you use.

THE COILS

These are wound on 6 pin formers, to be standard. The detector coil for 16-40 metres has 5 turns plate close-wound, 8 turns grid, spaced about the diameter of the wire. and 8 turns, reaction. Plate and reaction coils are about one-quarter inch away from the grid coil. Wind plate first, then grid, then reaction. Connections in order from the bottom will be, plate, earth, filament, grid, detector plate, and audio choke.

The aerial coil will have about 7 turns on the grid, and 5 on the aerial. Connections in order, are aerial, earth, grid and filament.

It is a good idea to make aerial, plate, and reaction windings so that they can be slid along the 1¼-inch formers, to find the best spacing. Use wire about 26 gauge silk covered, or enamelled.

To tune higher than 40 metres, try doubling all coil sizes, except reaction, which can probably remain the same. Add or remove turns, one at a time, until you get the right coverage. Slight adjustment to the turns we have already given might be required to get exact coverage.

The set is not particularly suitable for lower wavelengths, although you may be able to get it working down to 10 metres, by careful pruning of coils. Dimensions will probably need to be halved for this band.

If the set is used for amateur work only, 25 mmfds. tuning condenser will probably cover all amateur bands with something to spare. The trimming condenser should be 15 mmfds. In our set, it was 25 mmfds. You will have to experiment with the coils to get the bands to start in the right place, using our figures as a starting point.

If we are able to describe the A.C. version next month, some further constructional details, applicable to both sets, will probably find space. So even if you build this battery set, keep a look out for it!

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59 Erskine St., Sydney——B3510.

A SIMPLE BATTERY-OPERATED MODULATED OSCILLATOR

(Continued from Page 21)

and consequently a small amount of resistance wire can be used for connecting the positive terminal of the tube's socket to the positive side of the battery, so that the battery's voltage is reduced to about 1.54 volts when the battery is new. It is not absolutely necessary to use this resistance wire, but it is "good engineering" not to allow the filament voltage of a tube to ever become more than 10 per cent. higher than its rated value. We used 6in. of No. 34 s.w.g. Eureka resistance wire for this purpose. It is just 4in. from the positive terminal of the "A" battery to the battery switch, and 2in. from the other side of the battery switch to the positive filament prong of the tube socket. This makes up just the necessary 6in., and if these two leads are carried out with the resistance wire inside spaghetti tubing you can be assured that your tube will not be overloaded in any way.

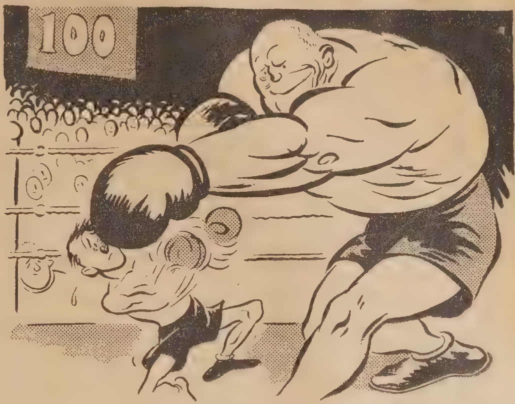
BYPASS CONDENSERS

It will be noticed that there are two bypass condensers shown in the diagram, from B plus to B minus. This was found necessary due to the fact that a fairly large capacity is needed to bypass low frequencies such as those produced in the I.F. band, but an ordinary paper condenser is not very efficient at the high frequencies produced when switching to the short-wave position. Consequently, we have employed not only a .1 mfd. tubular condenser, but also a .001 mfd. mica condenser, as this last condenser will operate quite efficiently even at the very high frequencies in the vicinity of 16 mega-cycles.

The dial settings for various frequencies, with any oscillator, will depend to a very large extent on the actual placement of the parts and the manner in which the wiring is carried out, consequently it is impossible for us to provide an accurate calibration chart. Readers are referred to Page 19 of the June issue of "Radio and Hobbies" for instructions on a simple method of carrying out this calibration. To assist in this work the calibration chart for the oscillator described is reproduced in this issue. The dial settings for any other oscillator should not vary by more than about 4 or 5 degrees from these printed, and consequently the printed chart will be of assistance in locating the approximate dial settings, and will save a lot of time in carrying out the accurate calibration.

Due to the very light "A" and "B" battery current of the single tube used, the life of the "A" and "B" batteries should be between 6 and 12 months with normal service.

The A.F. transformer connections shown on the diagram will be quite correct for all ordinary transformers. If any difficulty is experienced in getting the A.F. section to oscillate it may be necessary to reverse the connections to the primary winding of the transformer marked "P" and "B plus" in the diagram.



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ON THE AMATEUR BANDS

by A. V. Bennett

ALL BANDS ARE ERRATIC

INTERESTING FADING EFFECTS

Still further erratic behavior has characterised all bands during the last few weeks. Some interesting fading effects have been noticed which point to possibly unusual ionospheric conditions.

MOST of the amateur frequencies during the past month have been behaving in an even more erratic nner than during the earlier months the year. A very marked effect on twenty, forty and eighty metre nds has been the rapid fading all long distance transmissions. The med arrays can do very little to over- ne the failings, if they are such, of heaviside layer.

N TWENTY

On twenty metres, the fading has been a more gradual type than on forty res. The evidence of there being a inite critical frequency for one hun- ed per cent. operation on the high quencies can be observed by noting fading effects on these bands.

On forty metres, very noticeable on erstate signals, the strength of the nal remains constant over a period then a rapid fade commences, caus- severe distortion and making the sig- practically unintelligible; this is fol- ed by the signal fading down under noise level. Another station hin a distance of 100 miles or so n comes into the picture at maximum ength.

Twenty is a little different; the rapid fade causing distortion is absent, the signals from overseas sliding in and out in almost clock-like precision.

Eighty has been mostly confined to local contacts as the distant signals have been very irregular.

These effects are mainly caused by the different angles and height of penetration by the wave, depending on frequency at which it strikes the ionosphere. The ion density at the various heights or layers being different and as in the case of the forty metre signals the point or layer at which the propagated wave strikes is varying very rapidly in density, causes the angle of reflection to change and consequently the signal varies in strength, according to the skip where it is being received.

The vagaries of these changes brings a realisation of just how much we do depend on the ionosphere.

SHOULD IMPROVE

With the approach of the warmer weather conditions will become much more stable and the next few months should show a little improvement of conditions on all bands. Twenty should again prove to be the best band for all round DX work, both on C.W. and phone.

TEN METRES SHOWS LITTLE CHANGE

A few faithfuls still ply away at 10 metres, but no material difference appears to have taken place of late.

en metres is changing very little, re being no improvement. Signals m America are still fairly consistent. stations are also very active. The k or good period, is only short of ng best late in the morning. The erican amateurs use this band a for working across their continent, also to Hawaii. A number of them not appear to be interested in long ance work. There is no doubt that using the ten metre band in such a manner, relieves the congestion on the other bands.

Five-metre adherents are very active organising and giving lectures, etc. The scientific and theoretical side is being well covered. All those interested are always welcome at the Institute's meetings. So far, there have been no outstanding contacts made in the last few weeks. Still, hope springs eternal in the human breast.

WATCH FOR THESE

For those interested in zone 35, the only stations active there at the present time are CR4MM and CR4HT, both on about 14,415kc. The two other amateurs in that zone, ZD4AB and ZD2H are not active at the present time.

Three more good ones are I1ZZ, LY1BX, and CT1ZZ, the first two not far out from the edge of the band.

During the evening, HH2MC and HI6P have been calling CQDX, both on 14,395kc. The DJDC German DX contest was a little disappointing, as conditions were not very favorable, many European countries were active, but the signals from VK were not getting there VK2TF made 20 contacts during the first week-end of the test, not so many as he expected as a W8JK beam was erected for the occasion.

THE AMERICANS

The Americans appeared to be doing all right, as R8 and R9 reports were being exchanged through most of the time when the Europeans were coming through here, thus making it very difficult for the lower power VK's to push through the g.r.m. XE1CM out of the band with a buzz saw note was enjoying a feast, making a contact every few minutes. I have often wondered what power he runs as you will find him to the fore in every DX contest. It may be the special frequency he has chosen for himself.

The bulk of the phone work on twenty has been with the W's. They are still good during the afternoon, and showing improvement later in the evening. Not much use staying up after 12 p.m. these times as the band is almost dead. Although there are a few of the locals on, some running skeds. DX amounts to a few G stations and Americans mostly on CW.

EARLY MORNING

Early morning is becoming much better, the African continent amateur stations such as 3S. 3E and VQ2 are coming in around 5 a.m., most of them are on the high frequency end of the band. Europeans commence around 6.30 a.m., and can be worked through until 8.30 a.m. Conditions will improve during the morning, the probable change being, Europeans coming through earlier and fading out around 8 a.m. Some of the good ones in the morning are, PA0JQ, G2FZ, F8NP, G6GL, and G6GN, all on the R8 mark. It is very noticeable during the morning that as the sun gets higher so the signals get weaker; it is then on ten metres that things start to become a little busy.

Here is OA4AW seated beside his transmitter. He has been very active on 20 metres, and has provided many VK stations with their South American phone contacts for W.A.C.

SOME GOOD PERIODS ON TWENTY

Fewer blank nights and more interesting stations to be heard, are features of the twenty metre band over the last month. The re-appearance of Asian stations is also a welcome sign.

During the last month, there have been some very good periods on twenty metres. These periods lasting for two hours or more, have been in most case attended by the gradual fading effect.

Also there have not been as many blank nights as were previously experienced. During these periods many opportunities have presented themselves for good DX work, and a number of the active amateurs has taken full advantage of them. One very good phone contact was made by VK2TR, an EA.

ASIANS REAPPEAR

The reappearance of strong Asian signals is a very good indication of an improvement on twenty. Many strong XU, VU and J phone stations are now commencing to come through. Between 5.30 and 7 p.m. is good for the J phones. One good and consistent signal being J2NG. Believe J2MI is on a holiday in the U.S.A. probably getting ideas about Californian kilowatts. Many of the boys would like to hear FI8AC on the air again. He has been ill, but now O.K., and is expected to be on again very shortly. Did use c.w. on high freq. end and phone on about 14,100kc., VK2AGH has been making some very interesting contacts with XZ2DP, phone 14,075kc. Uses an RK20 running 25 watts input and is stationed with the Royal Signals at Pyawbwe on the Road to Mandalay.

Conditions for cw on the high frequency end of twenty, have been fairly good. Between 9 and 11 p.m. many stations can be worked, also the qrm is not too bad, and the result of this is the chance of a good rag chew. Around 5 p.m. HB1CE, 14,410 with a T7 note, is an interesting station, as he is situated in Liechtenstein. This is an independent principality between Switzerland and Austria, therefore, a new country. QSL to HB9CE.

FORTY METRE DX CONTAC

There is no doubt that good selective receiver i required on forty when th band does get busy, whic is around 7 p.m.; all States with the exception of VK are putting in RQ signals There are many more ama teurs using C.W. on forty than any other band a present, and what a variety of notes.

The best DX contacts for the mo on forty were HK5EA and HB9X, b on phone, and worked by VK4 HK5EA was also worked by AVK3 VK5, and heard by many more. guess there was a lot of power was when they were coming through. D ing the evening French phone stati can be heard; they are not too stro and, unfortunately, get covered up local qrm. The same conditions p vailed last month; possibly, if some the boys over there were using bea or something like that, we would pulling them through quite strongly few of the active phone boys, and gear they are using on forty metres

GOOD DX AT VK4FL

VK4FL, with an R9 signal, in Sydn uses a 3 stage crystal rig, with a p of 45's in push pull in the final, moc lated by a pair of 2A3's, class B. Fra has been working lots of W.'s on c and grabbed the HK5 and HB9 phone for himself.

VK4ES is very active; has had som thing like 650 phone q.s.o.'s on fo during the last month; likes this ba during the winter, especially for int state contacts. He has worked quite lot of DX during the winter mont W.'s, South Americans, and Canadia Herb. is missing out on Africa for forty metre W.A.C.

PIONEER IN BOURKE

VK2SE, who is a real pioneer, havi done a lot of work on 32 metres in t days gone by, has an fb. signal wi extra nice quality to his phone; n using a pair of tens in push pull, mod lated by a pair of 6L6's p.p. As Be is away up in Bourke, I should thi that amateur radio would be very us ful to him.

VK2MJ, a very active local on fort also using a ten in the final, runni 20 watts and modulates the ten wi a single 50, using choke Heising f the modulator system, and a half wa single wire matched impedance aeria

VK5KM believes in good audio equip ment. Most of the stages in his modu lator are coupled with 500 ohm line plus the necessary transformers. Th rig has an 809 in the final, modulat class AB2 push pull 6L6's, uses bot crystal and carbon mikes for reception a nice 7 tube super.

HE AMATEUR

MAKING

By
R. J. REYNOLDS
VK2AFR

A front view of the microphone mounted on a stand made from various odds and ends. The base from an old horn hand-speaker, and the light fitting, will be recognised.

THE microphone about to be described is known as a "Veletron." It is a velocity type of microphone employing a static instead of a magnetic field. It is very simple to onstruct and get into operation, and, f certain precautions are taken, is the deal microphone for the experimenter, "Ham," or P.A. enthusiast.

As the photographs show, the parts required for the microphone are few and consist of material that almost everyone has in the junk-box.

CONSTRUCTION

The microphone consists of a number of ribbons rather loosely laid across a perforated and totally insulated back plate, so that certain parts of each ribbon are free to move. A voltage difference is maintained between the ribbons and back plate by means of the D.C. circuit shown in the circuit diagram.

As the ribbons move they alter the capacity between themselves and the back plate, varying the charging current through the resistance R1, and causing a voltage drop across it which is proportional to their movement. This voltage is then applied to the grid of the pre-amplifier tube.

NO CURRENT

The microphone itself has no current drain; therefore the polarising voltage can be very easily filtered. The purpose of R2 and C2 in the circuit diagram is to accomplish this filtering. It is important that the filter condenser used be a good paper condenser and that the coupling condenser be a good mica condenser. Leakage in these circuits resulting from faulty condensers will cause very niosy operation of the microphone.

The back plate is of brass, one-eighth inch thick or thereabouts, measuring 5 inches by 2½ inches. Aluminium, zinc, or copper could also be used, but experiments here indicated that brass was the most suitable. This plate is drilled closely with 1-16th inch or 5-64th inch holes, the front of the plate polished, and ragged edges removed from the holes.

The next step is to give the surface a good coat of insulating material. It might be pointed out that this is the most important stage in the construction of the microphone unit, and too much stress cannot be placed on taking care of the insulating of the back plate.

Suitable insulators are shellac, clear Duco, or model aeroplane dope consisting of celluloid in acetone, which is known as acetone cement, and also another dope called amyl-acetate. The thinnest coating consistent with good insulation properties will result in the most sensitive and efficient microphone unit. Usually two or three very thin coats of insulator are sufficient, and this must be allowed to dry thoroughly before any attempts are made to attach the ribbons to the back plate. Poor insulation will result in a noisy and crackly microphone.

THE RIBBONS

The next step is to manufacture the ribbons. These can be made from any suitable foil. The foil used in this particular microphone (and a type which has been found very effective) is the wrapping from a bar of chocolate. The foil is ironed out before cutting to remove all wrinkles and creases.

The piece of foil is made the same length and about 1-16th inch narrower than the width of the back plate, and is then cut into strips about one-quarter or three-eighths of an inch wide. The slits separating the ribbons are not cut right through from end to end, but from about half an inch from one end to within about half an inch from the other. These blank spaces are to allow of the clamping-down of the ribbons. The barest fraction is then cut off the sides of each ribbon, so as to allow an aperture between each ribbon of from 1-32nd inch to 1-16th inch. This is done so that when the ribbons move under sound pressure they will not rub together. Rubbing causes the microphone to crackle and be noisy.

The foil should be cut with a razor-blade or other sharp instrument, and with a straight edge, while it is resting

A TWO-SHILLING MICROPHON

With Many Application

Here is a description of a simple microphone with a wide variety of uses. The parts used in its construction are few, and cost only a shilling or two. At the same time, it can give exceedingly good quality, and has no particularly critical adjustments. It should appeal to amateurs who at present are using carbon microphones of doubtful quality, and who would like to try their skill at making something better.

on a hard surface, such as a piece of glass

The method of clamping the ribbons to the back plate is shown in the photographs. The clamping screws are insulated from the back plate with the exception of one which is insulated from the clamp. The ribbons are fastened at both ends for the sake of convenience, although in commercial practice only one end is clamped.

Experiment here has indicated that, for general or P.A. use, the restriction placed on the frequency response by clamping both ends is not worth worrying about. The ribbons are separated from the back plate by a half-inch strip of photographic film or oiled silk.

CONNECTIONS

One of the clamping screws on the bottom clamp can be insulated from the clamp and ribbons, and allowed to contact the back plate. This will allow the two screws to be used as terminals for the microphone cable, as is done with the microphone described.

The second screw is, of course, insulated from the back plate, but makes contact with the clamp and ribbons. The clamps can be made of brass aluminium, &c., and are about half an inch wide and as long as the width of the back plate.

The microphone cable must be of good quality, and all soldering must be done with resin-cored solder or resin flux. Any leakage in the cable will result in noisy operation.

LENGTH OF CABLE

The length of the cable is not critical, and lengths up to 8ft. can be used without any drop in the output. When used with a good low-capacity cable, it is possible to run up to a length of about 500ft. between microphone and amplifier without very much loss in high-frequency response.

It is essential that the microphone unit be thoroughly shielded. A simple and effective shield is shown in the photographs.

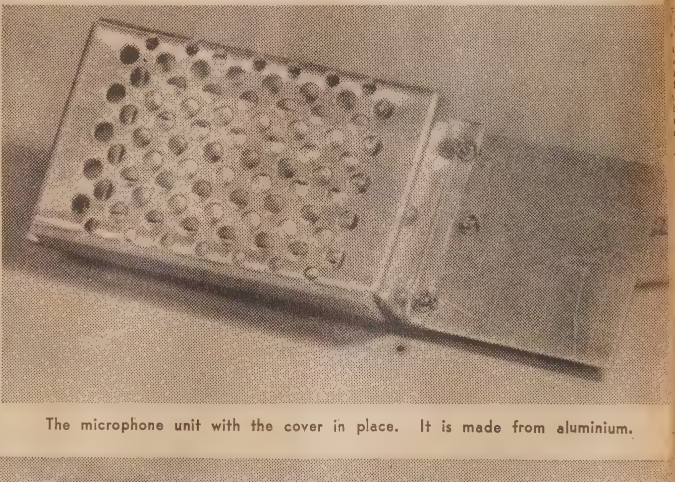
It is also essential that the input filter and coupling condenser comprising C1, C2, R1, R2 be completely enclosed in a separate little shield-can underneath the chassis to avoid hum pick-up. In the amplifier in use here, the filter and coupling components are wired around the input jack and the whole entirely enclosed, with just a small hole in one side of the can for the grid lead of the pre-amplifier tube.

In building the shield for the microphone unit, it might be pointed out that it is necessary to perforate the back of the shield as well. This is a true-velocity microphone—therefore it is necessary that the sound-waves be allowed a free passage through the unit, which makes it responsive from
sides.

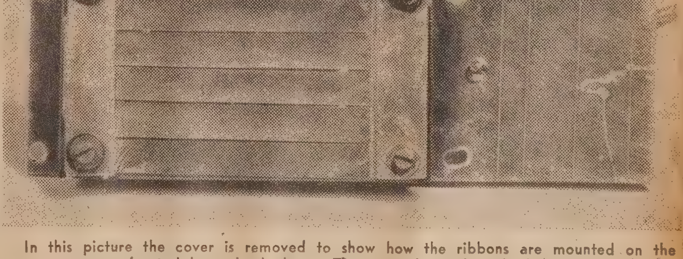
The matter of a case and stand
mount the finished unit in is depen
on personal ideas and tastes, so no e
will be made here to describe i
construction.

The frequency response of the mi
phone is governed to a certain ex
by the thickness of the insulator
to a greater degree by the amount
polarising voltage applied to the ribb

With low voltages of from 50 to



The microphone unit with the cover in place. It is made from aluminium.



In this picture the cover is removed to show how the ribbons are mounted on the perforated brass back-plate. They are clamped at both ends.

the ribbons are barely attracted he static pull to the back plate, and therefore allowed to move rather ly. The ribbons being more or less stricted in their movement, there- the microphone behaves like a -velocity microphone having a very frequency response.

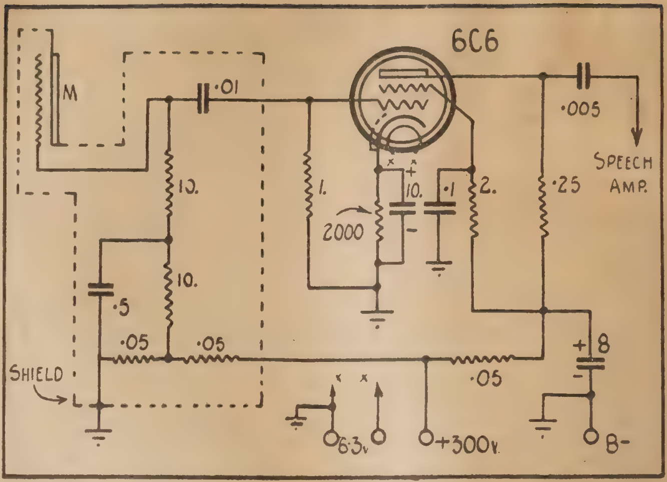
e microphone in this condition can- be used for close talking; otherwise low-frequency response would be ex- rated and the output becomes boomy. fe distance between the microphone speaker is 18in. to 2ft.

close talking is desired, then the rising voltage can be raised, up to mit of approximately 350 volts.

s the polarising voltage is raised the -frequency response becomes more more attenuated, due to the force which the ribbons are attracted the back plate. This extra force re- cts their movements, which in turn allow close talking without the put becoming boomy.

lso, when speaking close to the rophone it is good practice to speak oss the microphone rather than into because moisture from the breath iable to get between the ribbons and k plate and cause leakage, which once in results in noisy operation.

ncidentally, as the polarising voltage increased, so also is the output. The tage applied to this particular micro- one, as shown in the circuit diagram, pears to be a suitable level for general am" or P.A. use.



The circuit of a pre-amplifier which is suitable for use with this microphone. Note complete shielding of the input circuit.

The microphone has no hum pickup from magnetic fields, as it uses no transformer. It can be used quite close to power transformers, &c., without the slightest indication of hum. Also, its radio frequency pickup should be nil if the unit is shielded thoroughly.

It might also be mentioned that this microphone can be used in closer proximity to loud-speakers in P.A. systems than any other type of microphone, due to the fact that there is very little sound pickup from its sides.

(Continued on Page 77)

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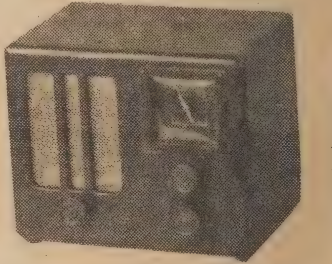

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- 2 Radiokes or R.C.S. Intermediates.
- 1 Henderson 40 M.A. Transformer.
- 1 Stromberg-Carlson 2-gang Condenser.
- 1 Yaxley .5 meg. Potentiometer.
- 3 I.R.C. .1 meg Resistors, 1 Watt.
- 1 I.R.C. .25 meg. Resistor, 1 Watt.
- 1 I.R.C. .5 meg. Resistor, 1 watt.
- 1 I.R.C. .1 meg. Resistor, 1 watt.
- 1 I.R.C. 50,000 ohm, I.R.C. Resistor.
- 1 I.R.C. 10,000 ohm, I.R.C. Resistor.
- 2 I.R.C. 50 ohm Wire Wound Resistors.
- 1 Chanex .1 mfd Tubular Condenser.
- 1 Chanex .05 mfd. Tubular Condenser.
- 2 Chanex .01 mfd. Tubular Condensers.
- 2 Solar or T.C.C. .0001 Condensers.
- 1 Solar or T.C.C. .0005 Condenser.
- 2 Solar or Ducon 8 mfd Electrolytics.
- 4 Marquis Wafer Sockets.
- 1 Acorn Valve Can.
- 1 Western Ready-drilled Cabinet.
- 1 Amplion or Rola Speaker, 1,500 ohms, suit Single Pentode.
- 1 Set Radiotron, Mullard, or Philips Valves, 6K8G, 6F7, 80 and EBL1.

Belden Wire, Nuts and Bolts, Solder, etc.

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Round the Trade

NEWS AND NEW RELEASE

RETURNING FROM EUROPE

Mr L. B. Graham

Mr. L. B. Graham, well known Principal of the Australian Radio College, who returns on September 14th from a nine month's stay in England and Europe.

MR. GRAHAM, while overseas, has very carefully studied the latest developments in Radio and Television. We are indebted to Mr. Graham for the very splendid series of articles entitled "An Elementary Course of Radio," which he prepared before sailing. We hope that Mr. Graham on his return will give us his impressions of overseas radio and television developments for the interest of "Radio and Hobbies" readers.

PALEC MULTI-BAND GENERATOR

SIMPLIFIES SET-LINING

A device which greatly simplifies set-lining is the new Palec multi-vibrator.

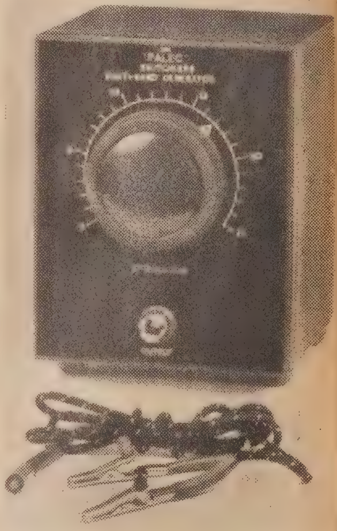
THIS instrument generates a tone over a wide band of frequencies having no sharply-peaked output. Its broad signal allows lining receivers, particularly when adjusting the padding, without constantly retuning to hold the signal or the station.

It is quite small, measuring 4⅞ x 4½ x 6 inches. An output control with a 2½-inch dial and an output socket are the only connections to the unit, apart from the power lead.

Two valves are used—a 6F8G as a rectifier and harmonic amplifier, and a 6N7G as the harmonic generator at 1000 cycles.

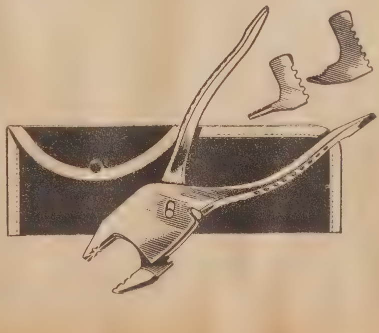
The generator lists at £6 18s 6d, and should be particularly handy when quick alignment of a receiver is required.

Paton Electric are located at 90 Victoria-street, Ashfield, to which address inquiries may be directed.



The Palec Generator

HANDY TOOL FROM NOCK & KIRBY



The PlieRench kit shown here, with its selection of adjustable jaws, makes light of any job where a strong, firm grip is required. Nock and Kirby sell hundreds of them at 25s because they replace so many tools. The PlieRench will hold anything from a hack-saw blade to a hair-pin. Comes complete with pouch for storing.

NEW STOCKS AT MURDOCHS

RECORDING OUTFITS—DIALS—TUNING CONDENSERS

Murdoch's Radio Department is the home of much specialised apparatus for the radio enthusiast and the amateur. Some popular, newly-landed lines are illustrated below.

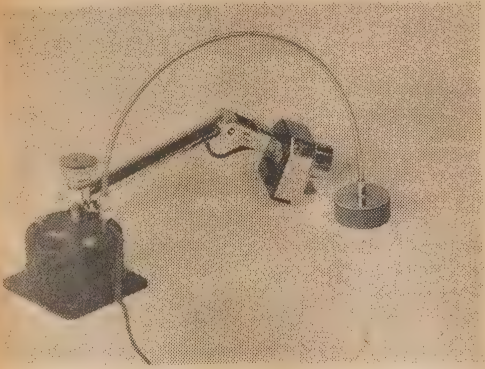
(1) The Ake-Simplex home recording it. The rubber suction cup fits on to e turntable of an ordinary gramo- one, and, by a series of gears, moves e cutting head to the centre of the ord blank.

Priced at £6/15/-, this represents good lue.

(2) A decimal slow motion drive dial. he Lissen Hi-Q decimal dial has been ecially developed for use with short ave receivers, although, of course, it ay be used on any receiver covering e broadcast band where accurate cal- bration is desired. The reduction of e drive is approximately 25/1, while special spring gears eliminate all trace of backlash.

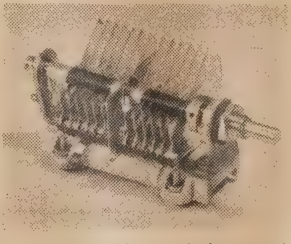
This handsome dial is priced at 22/6. It should appeal especially to amateurs.

(3) The Polar type "E" short wave transmitting condenser is a double-spaced job, with a shield plate between the two sections. Each section is of 40 mfds. capacity. It is thus equally applicable to receivers or to low-powered transmitters, in which it can be employed in a split-stator circuit. High-grade insulation and positive connection to the rotor shaft in two places, are provided. It is reasonably priced at 13/6.



The Ake - Simplex home recording head, nicely finished, and ready for action. Note the suction - cup drive which fits over the spindle, and regulates the cut.

The Lissen dial has two hands like a clock—one travelling ten times the speed of the other.



The Polar double-spaced short-wave condenser may be used in receivers or in small transmitters.

Norm. Cohen Joins Invincible Radio

NORM COHEN is now renewing many friendships in his new office as manager of Invincible Radio in Clarence-street.

He is probably one of the best-known identities in the radio parts business, and many will remember the heyday of home wireless building, when he was associated with Allan Burrows in the Royal Arcade, and later when he joined Mr. Burrows in partnership under the business title of Cohen and Burrows.

Before taking his present position, Mr. Cohen acted as sales manager for Fox and Macgillycuddy.

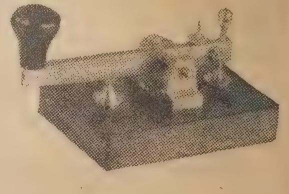
Mr. Cohen's close association with "Wireless Weekly" circuits enables him to supply parts for, and give advice on, the home building of sets.

PRICE'S AMATEUR GEAR

Having just opened a shipment of English components, Price's Radio announce new lines for the amateur. Perhaps the most interesting is the range of W.B. microphones which are available in two models.

(a) Moving coil type. This unit employs a permanent magnet, and the impedence is 30 ohms. A ratio of 60/1 has been found suitable for most valves. Housed in a high-grade bakelite case, this unit is fitted with four lugs for mounting in standard type microphone stands.

(b) A modified "Reiss" carbon type. It requires an energising voltage of four to eight volts, but it has been found to operate quite well on as low as 1½ volts. With a ratio of 40/1 the W.B. carbon microphone is quite inexpensive, costing only 20/-.



This fine key is available at Price's.

PANEL INDICATORS

The range of Bulgin panel indicators, consists of a bracket to hold a standard screw type pea lamp, and bevelled glass with nickel-plated rim for the front of the panel, are available in two sizes—1-inch and 3-8-inch.

Both sizes are obtainable in four colors—red, green, blue, and opal.

The well-known Radiomac short wave condensers have genuine Trolitul insulation, and all the metal parts are brass. Two ball races are used to ensure long trouble-free life. Single spaced types for receivers are available in sizes 15 to 250 mmf., while the double spaced types are to be had in 15, 40, and 160 mmf.

Morse keys are well represented in Price's stock, there being three senior models that are suitable for serious work. These are priced at 15/-, 17/6, and 25/-. There are two more lines for practice work, one at 7/6 with nickel silver contacts, and the baby of the range at 2/6.

As well as a complete range of radio components, this progressive firm has stocks of Hornby and Lionel trains, and are direct importers of the famous miniature Marklin "00" gauge electric trains.

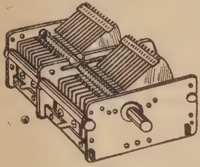
FOR ALL YOUR RADIO & HOBBY REQUIREMENT

HERE IS A SNAP

Here is a snap. Latest type midget synchronous phono motors, Constant speed (78 r.p.m.) 7-inch Turntable for 240 volt A.C.

Only 25/-

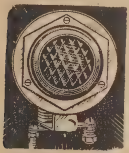
2-GANG BAR TYPE CONDENSERS



Brand new in original cartons. Have wide spaced oscillator section to overcome microphonic troubles. Plates can be removed for T.R.F. set as described in this issue,

worth 8/6 each. ONLY .. **2/6**

BULGIN PANEL INDICATORS



Available in Red, Green, Blue and Opal. 1½in. overall just the thing for transmitter racks, etc. Nickel plated holders. **2/6** each.

Also available in 3-8in. diameter, 2/- each.

HOWARD BUTLER MILLIAMP METERS

New Shipment just arrived. Overall dia. 2½in., 1¾in. face. Available in the following readings, 25 M/A, 100 M/A, 150 M/A, 250 M/A, 50 M/A .... **8/6** each

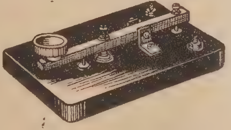
ENGLISH MICROPHONES

W.B. Moving Coil .... **£3** W.B. Reiss Type **£1**

TROLITUL COIL DOPE

Just what you have been waiting for. Puts a thin coating of trolitual over the coil. Trial size, bottle **6d**

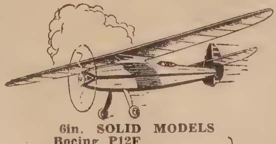
MIDGET MORSE KEYS



Just the thing to practice Morse sending and now is the time to improve your Morse, as operators are wanted for the army and for airways. 2/6 each.

Better type **7/6**

KITS OF PARTS



KITS OF PARTS for building model Airplanes. Below we list a few of the many types we have in stock.

8½in. SOLID MODELS
Bell Airacuda
Douglas Mainliner
Curtis Attack
Sikorsky S.4.3.
Martin Bomber
Beechcraft 18
1/3

6in. SOLID MODELS
Bocing P12F
Douglas 043a.
Vought V65.
Mister Mulligan
1/3

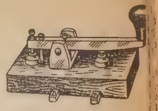
17in. FLYERS
Luscombe Phantom
1938 Fokker Pursuit
1938 Cub Sport
1938 Percival Gull.
1/3

16in. FLYERS
Beechcraft
Bellanca Flash
Mister Mulligan
Ryan S.T.
Dewoitine.
1/-

24in. FLYING MODELS, 2/6 EACH
Rearwin Speedster; 1938 Fairchild; Ryan S.C.; Bellanca Racer; S.E.5; Time Flies.

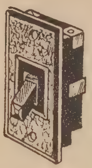
28in. ENDURANCE FLYING MODELS, 3/6 EACH.
Senior Cabin. Albatross (seaplane type).

NEW IMPROVED SENIOR MORSE KEY



Strongly constructed and well finished Brass lacquered. Contacts special nickel silver, base polished hard wood. **17/6** each.

BAKELITE RADIO TOGGLE SWITCHES



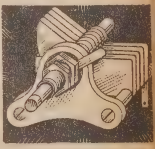
Strongly made switches. Just the thing for b
tery sets. Pick-ups, etc.
Usually 2/-. NOW **9**

ENGLISH MADE SLOW MOTION DIAL DRIVES

Will make any control a vernier. Fits on ¼in. shaft and takes a standard knob ratio 6 to 1. Velvet action, 7/6.

7/6

RADIOMAC SHORT WAVE VARIABLE CONDENSERS

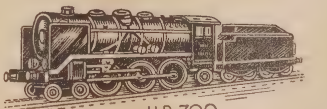


"RADIOMAC" Short Wave variable condensers use "Trolitul" Insulation, and are of all brass construction, with Ball Bearings for smooth operation. The Ball Race is electrically shorted obviating the risk of noise.
Both receiver and transmitting types can be ganged.

15mmf .. .. 5/9 40mmf 6/3
100mmf .. .. 6/9 160mmf 8/-
250mmf 8/9

Double spaced transmitting types:
15mmf .. .. 7/- 40mmf 8/-
160mmfd 12/6

MARKLIN "OO" GAUGE ELECTRIC TRAINS



H R 700

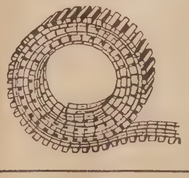
MARKLIN "00" GAUG ELECTRIC TRAIN

We are direct impor ers of this very popul size trains and ca offer each part se arately as listed b low.

LOCOMOTIVES	
R700	32/6
SLR700	42/-
HS700	75/-
HR700—Black	84/-
HR700—(LMS or LNER) ..	87/6
PASSENGER CARS	
327—Passenger, similar to 328	4/6
328—Van	5/6
341—Passenger Car	7/-
342—Dining Car	7/-
343—Sleeper	7/-
344—Luggage Van	8/9
RAILS, etc.	
3600—Straight or Curved ..	1/9
—Terminal Rail	3/6
—Crossing	8/9
—Manual Points, pr. ..	17/6
—Automatic Points, pr	33/6

GOODS TRUCKS	
362—Tipping Truck	3,
363—Covered Truck	4,
366—Crane Truck	7,
371—Open Truck	4/
372—Timber Truck	4/
374—Petrol Truck	5/
381—Closed Truck	3/
382—Fruit Truck	3/
388—Milk Truck	3/
389—Cattle Truck	3/
391—Bogie Goods	6/
392—Bogie Timber	9/
ACCESSORIES	
494UG—Automatic reverse unit	35/
478—Automatic Signal ..	29/
452—Tunnel	3/
467—Bridge	6/
444—Overhead Bridge	10/
422—Platform	6/
456—Level Crossing	12/
435—Signal	1/
499—Spare bulbs	1/
492—Rheostat	13
U498—Reverse unit	7

"FLEX-I-TRACK"



FLEX-I-TRACK for "O" gauge electri trains. The ideal rail where track ha to be taken up every time after use Simply roll it up. It will go under chairs over books and is very realistic, only

22/6

per coil of 10 feet.

PRICE'S RADIO SERVICE

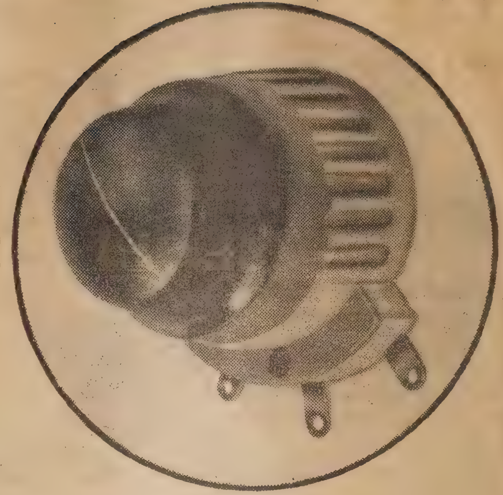
'Phone B4146. 5 and 6 ANGEL PLACE, SYDNEY

CATALOGUES POST FREE, FREIGHT EXTRA

TRADE NOTES

POWER RHEOSTAT BY I.R.C.

Reviewed here is a new I.R.C. component which has been built to very high quality standards. It appearance, performance and efficiency are well worthy of the famous name it bears.



The I.R.C. PR-25 Power Rheostat, a model of good workmanship and design. Full details are given in the accompanying review.

WITH the type PR-25, IRC introduces the first of a line of power rheostats, radically different in design and highly efficient in performance.

In the conventional types of power rheostats the ratings assigned are based on a temperature rise of 250 degrees C. Likewise, the power dissipated in any portion of the rheostat, without exceeding this temperature rise, is proportionate to the amount of the rheostat in circuit. For example: In a 25-watt rheostat only 12.5 watts can be dissipated at 50 per cent. rotation.

OBJECTS OF DESIGN

The object of IRC in developing the type PR-25 rheostat was twofold:

1. To reduce operating temperatures, at given powers, to a reasonable value without increasing size or cost.
2. To maintain full power rating regardless of how much of the rheostat is in service without appreciably increasing temperature rise.

These objectives have been met in the type PR-25, since it operates at full rating at about half the temperature rise of equivalent units and can be operated at full power of 25 watts in as low as 25 per cent. rotation without appreciable difference in the temperature rise.

The type PR-25, was designed to duplicate the size, cost and performance of existing types with the added economy and advantages of about 50 per cent. of the temperature rise at equal ratings.

This unusual performance is the result of novel design. The heat-dissipating properties of aluminium are utilised to full advantage in the winding core of the resistance element and the housing of the rheostat. Through proper use of best grade mica and special asbestos, the insulation properties of the rheostat are sufficient to meet all service requirements.

These two factors allow safe operation, at full 25 watts, down to 25 per cent. of full rotation with a temperature rise of about 160 degrees. C,

CONSTRUCTION

HOUSING

Ribbed die cast aluminium alloy case designed to conduct heat away from resistance element. Since the external sides of the case are ribbed, it offers exceptionally efficient heat radiation. Intimate contact between rheostat and panel allows rapid conduction of the mounting of a portion of the heat dissipated.

RESISTANCE ELEMENT

Low temperature coefficient wire is uniformly wound on a strip aluminium core insulated by the best grade asbestos available. This insures uniform heat distribution throughout the entire resistance element irrespective of how much of the element is actually in service.

Through the use of layers of best grade mica the resistance element is insulated from the die cast housing. This construction allows more than sufficient insulation and at the same time aids in the conduction of heat from the element to the housing.

CONTACT

Contact is made to the large radius edge of the resistance element by means of a special alloy which will not pit or stick. Close calibration and smooth variations in resistance are achieved at all points on the element. Pressure is provided by means of a separate steel spring, not in the current carrying path, thus separating the two functions of carrying current and applying pressure.

CLOCKSPRING

A flat clockspring of sturdy and efficient design is used to connect the sliding contact to the centre terminal. This eliminates the conventional series pressure contact, thus preventing the many troubles which usually occur at this point.

JOHN MARTIN IS BUSY

JOHN MARTIN, the "Friendly Wholesaler," reports an exceptionally busy period over the last few months.

One of his best sellers at the moment is the "Economy Six" battery set, described in the first issue of RADIO AND HOBBIES. Mr. Martin has almost lost count of the kits of parts he has sold for this receiver.

The 4/39 is at present chasing it very hard, according to Mr. Martin, and he is well into double figures on actual sales.

John Martin, it will be remembered, handles the famous Raymort line of amateur transmitting and receiving condensers, which are very popular among set-builders.

RADIO SUPPLY STORES

MANY a budding inventor has obtained materials and advice for his radio set or transmitter from Radio Supply Stores, one of Sydney's pioneer firms, located at 7 Royal Arcade, Sydney.

Besides carrying full stock of new goods, a special department deals with used radio sets and equipment, where valves, transformers, speakers, etc., may be purchased for half the original price. All these are thoroughly tested, and are fully guaranteed by the firm.

DUCON'S MIDGETS

A particularly successful line of midget 8 mfds. filter condensers rated at 525 volts peak are selling well for Ducon.

These condensers are available in cans, or tubular types with pigtail and solder-lug ends. Despite their extremely small size, many technicians consider these condensers some of the very best that have ever left the Ducon factory.

E.T.C. CONDENSER IMPROVEMENTS

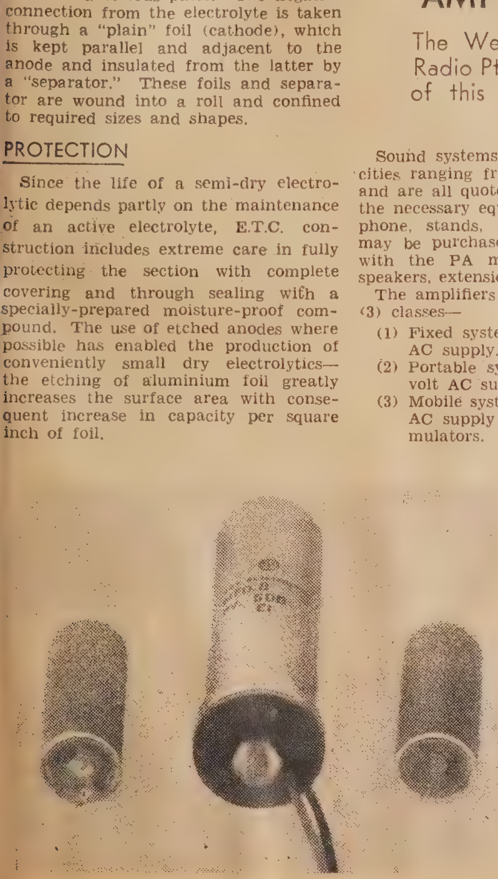
New processes developed by the technical division of E.T.C. Industries, Limited, have resulted in further refinements and improvements to the well-known E.T.C. semi-dry electrolytic capacitor range.

THE essential dry capacitor requirements of minimum leakage, long maintenance of full capacity under adverse conditions, low power factor, the ability to withstand full rated voltage and over-voltage, are combined with unique and strong terminal-tab construction, incorporating an entirely new method of tab-insulation which ensures entire freedom from corrosion.

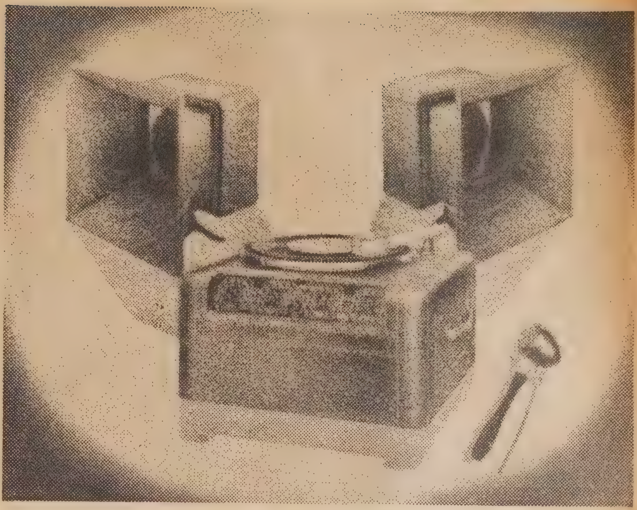
The dry type of electrolytic, like the wet, makes use of a positive electrode (anode) of "formed" aluminium: i.e., pure aluminium foil possessing a thin insulating film which acts as a dielectric. This anode contacts an electrolyte which is a viscous paste. The negative connection from the electrolyte is taken through a "plain" foil (cathode), which is kept parallel and adjacent to the anode and insulated from the latter by a "separator." These foils and separator are wound into a roll and confined to required sizes and shapes.

PROTECTION

Since the life of a semi-dry electrolytic depends partly on the maintenance of an active electrolyte, E.T.C. construction includes extreme care in fully protecting the section with complete covering and through sealing with a specially-prepared moisture-proof compound. The use of etched anodes where possible has enabled the production of conveniently small dry electrolytics—the etching of aluminium foil greatly increases the surface area with consequent increase in capacity per square inch of foil.



Two carton-type electrolytics on each side of a more conventional can type.



One of the Webster-Chicago amplifiers for portable use.

AMPLIFIERS BY INTERNATIONAL

The Webster-Chicago range handled by International Radio Pty. Ltd. is the most extensive and complete range of this equipment which is available from any one distributor in Australia.

Sound systems are available in capacities ranging from 60-watts to 8-watts and are all quoted either complete with the necessary equipment such as microphone, stands, etc., or the amplifiers may be purchased separately and used with the PA man's own microphone, speakers, extension cords, etc.

The amplifiers fall roughly into three (3) classes—

(1) Fixed systems for use on 240-volt AC supply.
(2) Portable systems for use on 240-volt AC supply.
(3) Mobile systems for use on 240-volt AC supply or on 6-volt DC accumulators.

The fixed systems are available in output wattage ratings from 60-watts down to 25-watts, and the portable systems are available in wattage ratings from 25-watts down to 8-watts, and the mobile systems are available in either 18-watt or 28-watt outputs.

Special foolproof plugs are used in the mobile unit so that it is impossible to plug the 240-volt AC into the 6-volt input or vice versa, thus eliminating any danger of damage to the AC power pack or to the DC vibrator used for high tension supply.

The amplifiers themselves, particularly the Model M928 28-watt amplifier, are of interesting construction. In the Model M-928 three separate input channels are provided, each equipped with a most satisfactory fader in the input circuit. Separate controls are provided for both base and treble control.

On the output side, provision is made for the use of either one or two speakers with the impedance matched direct to the voice coil of the speaker. Alternatively, low impedance line output taps are provided where the speakers are to be mounted some considerable distance from the amplifier.

Twelve inch permagnetic speakers with a flux density of 90,000 lines per speaker and an audio handling capacity of 15-watts continuously are provided with these Model M-928 systems, and also a dynamic type hand microphone.

International Radio Pty. Ltd., of 254 Castlereagh-street, Sydney, invite those interested in either public address work or inter-office communication work to write to them requesting a copy of their latest Webster-Chicago range catalogue.

S.W. TUNING CHART

13 METRES
16 METRES
19 METRES
25 METRES
31 METRES
41 METRES
49 METRES

13 METRES

No stations now audible at entertainment level.

16 METRES

Stations rarely heard at enjoyable level.

19 METRES

GSO Daventry, 19.76 m. 7.20 a.m. till 9.0 a.m. and also in forenoon.

GSF Daventry, 19.82 m. Same times as GSO.

GSI Daventry, 19.66 m. 3.0 p.m. till 5.15 p.m.

DJB Berlin, 19.74 m. Heard best in afternoons.

DJR Berlin, 19.56 m. Very good in forenoons.

YDC Bandoeng, 19.8 m. Good at 9.0 a.m. and excellent again at night by 10.0 p.m.

TPB6 Paris, 19.83 m. Very good from 4.0 p.m.

25 METRES

GSD Daventry, 25.53 m. Very good from 3.0 p.m. till 5.15 p.m.

XGOY Chungking, China, 25.21 m. 7.0 a.m. also 9.0 p.m. News at 9.20 p.m.

MTCY Hsinking, Manchukuo, 25.48 m. Opens at 7.0 a.m. very loud. News in English.

RNE Moscow, 25.0 m. 7.0 a.m., 2.0 p.m. and 4.0 a.m.

SBP Motala, Sweden, 25.63 m. 6.30 a.m. till 7.15 a.m.

31 METRES

GSB Daventry, 31.55 m. 2.0 p.m. till 2.30 p.m. and 3.0 p.m. till 5.15 p.m.

DJA Berlin, 31.38 m. Very good at 1.30 a.m. also 8.0 a.m.

KGEI Treasure Is., 31.48 m. Best at 5.0 p.m. and 10.30 p.m.

KZRM Manila, 31.35 m. Excellent at 9.0 p.m.

TAP Ankara, Turkey, 31.7 m. Excellent till 8.0 a.m.

2RO3 Rome, 31.13 m. Also very good from 6.30 a.m. till 7.30 a.m.

TIPG San Jose, Costa Rica, 31.19 m. Very good at 10.0 p.m.

41 METRES

TPB11 Paris, 41.21 m. Very loud from 4.0 a.m. till 8.0 a.m.

CSW8 Lisbon, 41.3 m. Also good from 7.0 a.m. till 8.0 a.m.

YDX Medan, 41.55 m. Best heard at 10.30 p.m.

49 METRES

ZHJ Penang, 49.3 m. Very loud at 10.0 p.m.

Radio Saigon, 49.05 m. 9.0 p.m. till 9.45 p.m. in English.

GSA Daventry, 49.59 m. Best heard at 7.0 a.m.

DJC Berlin, 49.83 m. Also heard well at 7.0 a.m.

WLWO Cincinnati, 49.5 m. Heard best at 9.0 p.m..

Times shown are not necessarily opening times, but are when best reception may be expected.

OVERSEAS BROADCASTERS

The general short-wave listener again has a very wide selection of stations to listen to, as daylight reception and also after 10.0 p.m. has been very good during the past few weeks. The 19 metre band also shows signs of improving in the hours from 8.0 p.m. onwards, and within a very few weeks now reception on this band should improve greatly at this time.

GERMANY. All the usual German stations are still being heard very well both on the 19 metre band in the forenoon and afternoons, and also on the 31 and 49 metre bands in the early morning. A feature of these stations is the excellent music they transmit, the quality of which is better than quite a number of local broadcast stations.

U.S.A. The best American station is still W6XBE, on 31.48 metres, which comes in very well both in their afternoon session and a'so from about 10.30 p.m. onwards. Another station now being heard well is W8XK, on the 25 metre band, which is heard best at about 10 a.m.. The Cincinnati station W8XAL, on 49.5 metres, is now improving, and on most nights can easily be followed at 9 p.m.

COSTA RICA. For those who care for the Latin-American stations there is TIPG, on 31.19 metres, which opens at 10 o'clock every night and plays some excellent marches, &c., before going on to their spoken programme, which is of oourse in Spanish. Another Costa Rican station is TILS, which also opens nightly at 10 o'clock with the "Stars and Stripes" march, but this one is not so loud as TIPG. The wavelength of TILS is 48.66 metres.

MANCHUKUO. As mentioned in other article the Manchukuo station MTCY has now started a transmission in English which opens at 7 a.m. on 25.48 metres. This session is really intended for Europe, but is heard here at very good strength.

ISLAND STATIONS. Two of the Pacific Island stations which are coming in here well at present are VPD2, on 31.46 metres, which is located in Suva, Fuji, and is heard best at 9 p.m. Then there is FK8AA, which uses the 49.0 metre channel and is heard on Wednesday and Saturday afternoons at 5.30. FK8AA is situated in Noumea.

ITALY. The 31 metre Italian stations are still giving very enjoyable programmes in the early morning through 2RO3 and 2RO9. While if anyone should be up at 4 a.m. there is IRF on 30.52 metres coming in at great strength. At the same time, IQY, on 25.74 metres, is also one of the loudest stations on this band.

RAY SIMPSON'S PAGES

The MONTH on SHORT WAVES

HIGHER FREQUENCIES ARE IMPROVING AT NIGHT

Since we wrote last month's notes there has been a very decided improvement in the lower wave-length or higher frequency stations especially on the 19 metre band where on some nights recently we have heard all the well-known broadcasters at quite good signal strength.

FAMOUS ANNOUNCER

Edward Startz, the famous PHOHI announcer, who makes announcements in Dutch, English, French, German and Spanish.

In the period between 7 a.m. and noon, and also from 3 p.m. till around 5 p.m., this same band is really excellent, especially the Daventry and Berlin stations, though Finland, Poland, Norway, Italy, U.S.S.R., U.S.A., and India can also be heard at varying strengths.

At our own location there has not been any marked improvement in the 16 metre stations, but, if the 19 metre stations are any criterion, it looks like an early return to summer receiving conditions, when these higher frequency stations are heard so well at night.

All the other bands are about the same as last month, with perhaps a slight improvement on 49 metres, though, of course, the noise level is always rather high.

Listeners should watch the 41 metre band for new stations, as there probably will be a few testing within the next few weeks, preparatory to taking up their assigned frequencies when the band becomes available on September 1. Of course, as we know, France and Portugal are already using this new channel.

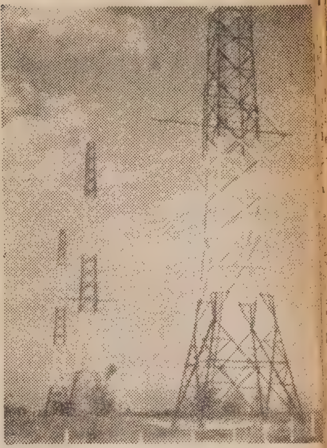
STATION ADDRESSES

As we have had several requests from listeners for the address of various short-wave stations, we propose to publish from time to time the addresses of some of them which may not hav been printed elsewhere. In addition t this, we shall always be pleased to advise any readers by mail, in cases wher the addresses they require have no been published. The only thing w would ask is that a stamped, addresse envelope be enclosed, as our mail i rather extensive at the present time

To the many readers who have written us, giving us reports on their reception, and expressing their appreciation of this section, we extend ou thanks, and would again ask any listeners who have not already done so t write us giving any suggestions of anything they would like to see included i future issues.

We would remind readers that, a issues are at present published at fou weekly intervals, reports for the nex issue should reach us not later than September 4 in order to ensure inclusion in the October number.

Aerials At HAS-HAT



The antenna towers of HAS-HAT, Hungary.

Radio Burgos or Madrid

An interesting point has just arisen as to the identity of the Spanish station on 9860 kc, 30.43 m. In company with our readers we have understood that this was EAQ, Madrid, as we have heard them announce as "Radio Espagna," Madrid.

HOWEVER, we have just received advice from "Radio Burgos" that they have recently changed their wavelength and are now operating on 9860 kc., 30.43 m., which is, of course, the same as that used by Madrid

As no operating times were given for "Radio Burgos," it is difficult to determine whether they are one and the same station. Any observations by readers on this point would be appreciated

U.H.F. CONDITIONS ARE POOR

The U.H.F. bands now seem to have definitely closed up for the season, as only a few of the 11 metre ones are now audible, chiefly W6XKG, W8XNU and W4XA, and even these are not at any great strength.

WHEN the bands become good again we will have very little on the 9 metre channel excepting the police radios, as the new frequency allocations will then be in force, which will have moved most of the broadcast stations to the higher frequencies. Some interesting listening will, however, still be possible by tuning for these police radios, also the many special emergency stations which are in use on nearby channels

TO conform with a new ruling of the Federal Communications Commission with regard to international broadcast stations, the well-known Pittsburg station, W8XK, has recently changed its call letters to WTIP, and is thus now removed from the experimental class. We have heard this new call used both in their 19 and 25 metre transmissions, so they will probably use it for all their other frequencies as well.

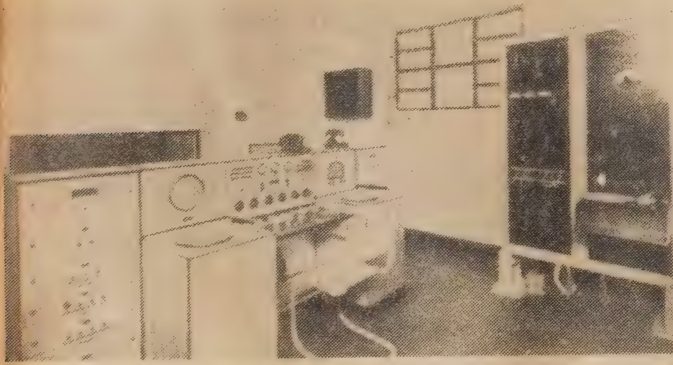
NEW FREQUENCIES For MANILA and MANCHUKUO

Since our last issue there has been some interesting extensions in the Manila stations, and as they are being heard at good strength in Eastern Australia at the present time we will endeavor to give a short summary of what their calls and frequencies are at the time of going to press.

KZIB—This station is now operating in 9500 kc, 31.58 m., and also on a new requency of 6040 kc, 49.67 m. On this after one they are heard at good trength both in Sydney and also in Dubbo, but are interfered with slightly by YDD, in Bandoeng.

KZRH—"The Voice of the Philippines," which we reported in the stop-press column last month, operates on 6110 kc, 49.1 m., and is also received at quite good strength every night. We believe this is an entirely new Manila station, both on the broadcast as well as the short-wave band.

The station on 6140 kc, 48.86 m., is a bit of a problem in connection with its actual call letters, as, when first heard, its call was KZRM, "Radio Manila"; shortly after, it appeared to give most of the programmes of KZEG, "The Sunshine Station," while just recently we have heard them announce as KZRF, "Radio Philippino."



The monitoring control desk and auxiliary audio amplifiers at station PRA8, Pernambuco, Brazil.

By consulting call lists of as far back as 1936, we found that KZRM was listed on 6140 kc, which makes it appear as if this is really the correct call, and the other ones only the calls of stations they sometimes re-broadcast. In support of this opinion we have advice from Mr. Lee, of Dubbo, that on August 1 he heard the official opening of KZRM, on 48.86 m., when speeches were given by the President of the Philippines, also officials from the Chamber of Commerce, Public Works Commission, etc. If any readers can advise us definitely what the real call letters are, it will help to clear up the situation. At the present time we would give as our opinion that it is KZRM.

On 9570 kc, 31.35 m., KZRM, "Radio Manila," is heard very well as early as 7.30 p.m. This is the oldest of the Manila stations, and has been heard for many seasons now.

KZHS—The other Manila station which was heard a few weeks ago on 9580 kc, 31.32 m., has not been heard now for a few weeks, but may pop up again on a new frequency.

MANCHUKUO

The Manchukuo station, MTCY, situated in Hsinking, has recently been heard on a new frequency of 11,775 kc, 25.48 m. They open every morning at 7, when all English announcements are given. This session appears to be mainly for reception in Europe, but comes in very well in the eastern States. This new frequency was first reported to us by Mr. Keast, whose ability in logging the Oriental stations is well known to all readers.

Just as we write these notes we have also heard MTCY on another new frequency, 15.205 kc, 19.73 m., just lower in wave-length than DJB. They were heard in this position from 9 p.m. till just after 10 p.m., when they closed abruptly. All announcements were in their own tongue except call, which was given twice in English.

In addition to the three frequencies we have already heard namely, 6125 kc, 11,775 kc, and 15,205 kc, we understand they also have a frequency in the 31-metre band, 9545 kc, but we have not heard them on this frequency as yet.

ARGENTINE REPUBLIC

Another new station heard since last issue is LRA1, on 17.830 kc, 16.83 m., which we heard one Saturday morning from 7.15 until just after 8 o'clock. Strength was quite good at first, but soon faded. Programme was a talk by the Minister of some Department, but we could not catch the actual name.

TURKISH STATIONS

FULL DETAILS OF TIMES AND TRANSMISSIONS

THE Turkish Broadcasting System at Ankara ask us to publish the following information relative to their stations which we feel sure will be of interest to our readers.

Call Letters	TAQ	TAP	TAR
Power Output	20 kw.	20 kw.	120 kw.
Freq. and	15,195 kc.	9465 kc.	182 kc.
Wavelength	19.74 m.	31.70 m.	1648 m.
Transmission Times	8.30 p.m.- 10 p.m.	2.30 a.m.- 8 a.m.	8.30 p.m.- 10 p.m. & 2.30-8 a.m.

Opening Announcement: "This is Ankara calling, transmitting the Turkish National programme."

Closing Announcement: "Dear friends and listeners, we are now closing down."

Closing Selection: Turkish National Anthem.

Interval Signals: Provisionally. Oscillation of 400 frequency.

Announcers: Men and women.

Languages: Turkish, English, French, and German.

Address for Reports: Correspondence Department, Radio Ankara, Ankara, Turkey.

Reports of Reception from listeners are welcomed and verified against return postage in the form of International Reply Coupons. Please try to give times of reception in G.M.T.

English Talks: Sunday morning from 6.0 a.m. till 6.20 a.m.

Dance Music: Broadcast daily at 3.0 a.m. and 7.20 a.m.

A NEW German short-wave station using the call DXB has just been heard on 9700k.c., 30.93m., opening at 7.15 a.m. with news in English. They actually announce as being on 31.22m., but they were definitely using 30.93m., just lower in wavelength than Daventry GRX, which is on 30.96m. Strength was excellent till closing at 7.40 a.m.

FLASHES FROM EVERYWHERE

CANADA

The Vancouver station VE9CS has recently changed its call sign to CKFX. This station is operated by the Standard Broadcasting System, Ltd., and operates on 6080 kc, 49.34 m.

NEWFOUNDLAND

A short-wave station has recently started operations in this country, and uses the call letters VONG while relaying the broadcast station VONF. It is located in St. Johns, and uses 5980 kc, 50.17 m, which makes its reception here very problematical.

U.S.A.

We have just been advised by the General Electric Co. in San Francisco that their Treasure Island station W6XBE will commence transmitting on 6190 kc, 48.47 m, early in August, so will probably be on the air by the time this is published.

RUMANIA

We understand that there is now another Rumanian station operating on 12,210 kc, 24.6 m, and which is on the air between about 5.0 a.m. and 6.0 a.m. Announcements are in French, and also in English. The address and call letters are not known at present.

BAHAMAS

This West Indian colony has recently inaugurated a short-wave transmitter on 6090 kc, 49.25 m. The power is 200 watts, and station is located in Nassau, the capital. Operating times are 4.30 a.m. till 5.0 a.m., and also from 11.0 a.m. till noon. Anyone hearing this station should send their report to the Secretary of Broadcasting, Office of the Director of Telecommunications, East-street, Nassau, Bahamas, B.W.I.

BOLIVIA

This very hard to hear South American country now has a station, CP1, which is using the 9892 kc channel, 20.33 m. They are located in Sucre, and are on the air from 2.0 a.m. till 3.0 a.m., and also from 10.0 a.m. till noon.

MORE U.S.A. CALL SIGN CHANGES

SINCE writing our article re the change in call letters of W8XK to WT1P, we have also heard the following U.S.A. stations using their new calls:—

WT1P.—Pittsburg, Pa., formerly W8XK.

KGE1.—Treasure Island, Cal., formerly W6XBE.

WGEA.—Schenectady, N.Y., formerly W2XAD.

WGEO.—Schenectady, N.Y., formerly W2XAF.

WLWO.—Cincinnati, Ohio, formerly W8XAL.

THE CHIEF PORT OF ECUADOR

Through Guayaquil, the chief port of Ecuador, flows the commerce of the country. The waterfront, with its modern streets and parkways, contrasts with the surrounding primitive mountain trails.

THE MONTH'S VERIFICATIONS

Police 9-metre Radio From U.S.A.

CB970, Valparaiso, Chile. From this station we received a plain but effective QSL card verifying our reception of March 26. According to card they re-broadcast the broadcast stations CB76 and CB78 and term themselves La Cooperativa Vitalicia, La Vox de Chile para toda America.

KQDH, Amarillo, Texas. We received a very interesting verification from the Mayor of this city confirming our reception of the Amarillo Police radio station on 9.5 metres. He concluded his letter as follows: "With best wishes to you and your friends in the wonderful country of Australia."

KAOC, Wichita, Kansas. Another interesting U.H.F. verification was received from this station confirming our reception of their first field test on 9.5 metres, which was found to be about 40 miles effective coverage. This was their first report from Australia, and at the time of our reception they were using 154 watts. Operated by Kansas Gas and Electric Co.

WQJF, Chicago Park, Ill. Another police radio verification sent by Mr. Edwin A. Nelson, radio despatcher, confirming our reception of their 9.7 metre signals. They operate 58 squad cars and use 100 watts, and this was also their first report from Australia. Mr. Nelson gave details of some of his war experiences when he was attached to the 5th British Army, where he became acquainted with some of the Australian artillerymen, one of whom was a Mr. Cashmere, of Sydney.

TAP, Ankara, Turkey. Just after we went to press last month we received our verification from TAP and TAQ in the form of a letter, in which they stated that their QSL cards are not yet ready. This verification brought our countries verified total up to 111.

"RADIO BURGOS," Burgos, Spain. An attractive verification card was sent by this station confirming our report of February last on their 41 metre band station. As stated elsewhere they now state they are on 30.43 metres. An interesting point to notice is that all Spanish cards are still passed by the military censor.

WQLJ, Racine, Wisconsin. The Chief of Police, Mr. A. J. Muhlke, sent a very nice letter confirming our report on their U.H.F. signals, and advised that though they had received reports from England and Ireland, this was their first one from Australia.

Listen for these!

OVERSEAS STATIONS NOW AUDIBLE

Here is a list of short-wave stations which have actually been heard over the last few weeks. Most of these should be heard by any of our short-wave fans who have a good set and location. Details of each station are given, and when also reported by readers, their names appear in brackets.

ENGLAND

GSA.—6050k.c., 49.59m. In the mornings this Daventry can be heard at good strength with their European programme. (Ford.)

GSB.—9510k.c., 31.55m. Used in the No. 1 and No. 6 transmission when they are very good. (Lee, Emery, Ford, Foster.)

GSC.—9580k.c., 31.32m. Can be heard well in the early morning at 3.0. (Ford.)

GSD.—11,750k.c., 25.53m. In the afternoon comes in at R9. (Lee, Emery, Ford, Foster.)

GSF.—15,140k.c., 19.82m. This one is very loud in the early morning and also in the forenoon. (Keast, Emery, Lee, Ford, Foster.)

GSG.—17,790k.c., 16.86m. Heard at fair strength at 11.0 p.m. (Lee, Ford, Keast, Battis, Foster.)

GSI.—15,260k.c., 19.66m. A good station around 4.0 p.m. (Lee, Ford.)

GSJ.—21,530k.c., 13.93m. Heard at R3 at 11.0 p.m. by Mr. Lee.

GSO.—15,180k.c., 19.76m. In the forenoon is very strong with their South American session. (Lee, Ford, Foster, Keast.)

GSP.—15,310k.c., 19.6m. Comes in at fair strength at 7.20 a.m. (Lee, Ford, Foster.)

GSV.—17,810k.c., 16.85m. Only heard at R4 by Mr. Lee and Mr. Keast. (Ford, Foster.)

GRX.—9690k.c., 30.96m. In the early morning is a very good station with their European session.

GERMANY

DJA.—9560k.c., 31.38m., Berlin. This is a very loud station, both at 7.30 a.m. and also at 2.0 p.m. (Lee, Emery, Ford, Keast.)

DJB.—15,200k.c., 19.74m. Heard very well both in the forenoon and also in the afternoon. (Lee, Emery, Ford, Foster, Keast, Battis.)

DJC.—6020k.c., 49.83m. In the early morning this German can be tuned in at very good level. (Lee, Ford, Foster.)

DJD.—11,770k.c., 25.49m. This 25-metre German is only fair strength in the afternoon. (Lee, Foster, Ford.)

DJE.—17,760k.c., 16.89m. Heard best at 8.0 a.m., when they are good speaker strength. (Lee, Emery, Ford, Foster, Battis.)

DJH.—17,845k.c., 16.82m. At 11.0 p.m. we heard this one, but it was very weak. (Foster, Battis.)

DJL.—15,110k.c., 19.85m. Only fair at 4.0 p.m. in Sydney. (Ford, Battis, Keast.)

DJN.—9540k.c., 31.45m. In the afternoon at 2.0 this one puts in quite a nice signal. Also heard around 7.30 a.m. (Lee, Foster, Ford.)

DJP.—11,855k.c., 25.32m. Only fair strength at 2.0 p.m.

DJQ.—15,280k.c., 19.63m. One of the best Germans on the 19-metre band. Very good forenoon and afternoon. (Lee, Foster, Ford, Battis.)

DJR.—15,340k.c., 19.56m. Heard at same time as DJQ. (Emery, Lee, Ford, Keast, Battis, Foster.)

DJX.—9675k.c., 31.01m. One of the best morning stations on the 31-metre band. (Lee, Foster.)

DJZ.—11,797k.c., 25.43m This one can just be heard on opening at 7.50 a.m. Notice changed frequency, from announcement. (Ford.)

DZC.—10,290k.c., 29.15m. We have heard this one from 3.45 a.m. till closing at 4.35 a.m., when the entire programme is in Arabic. Strength was absolutely the loudest we have heard from any German on any band.

DZH.—14,460k.c., 20.75m. Heard in the mornings at 8.0, with programme for South America. (Keast.)

DJY.—6072k.c., 49.41m., Berlin. Dr. Gaden reports hearing this station one morning at 7.30 with call in English. This one not listed in latest German programme list, so may be new transmitter.

FRANCE

TPA2.—15,245k.c., 19.68m., Paris. On some nights can be heard at quite fair strength around 11.0, but usually is very weak.

TPB3.—17,850k.c., 16.81m. Now only heard very weakly at 11.0 p.m. (Battis.)

TPB7.—11,885k.c., 25.23m. Very good in the afternoon, gives English news session at 2.0 p.m. (Ford, Foster.)

TPA3.—11,885k.c., 25.23m. Another French station very good in the early morning, and also at 4.0 p.m. (Ford.)

TPB11.—7280k.c., 41.21m. A very loud Signal is heard from this one in the early morning around 7.0. (Foster, Lee, Ford.)

TPA4.—11,720k.c., 25.6m. This one also strong during English news session at 2.0 p.m. (Emery, Lee, Ford, Foster.)

TPB6.—15,130k.c., 19.83m. Now improved very much and heard at good strength at 4.0 p.m. (Emery.)

TYA2.—9037k.c., 33.19m. At 3.30 a.m. this one has been heard with fair signal, but also much better at 5.0 p.m.

U.S.S.R.

RV15.—4273k.c., 70.21m., Kharbarovsk. This Far Eastern station was heard by Mr. Lee at R5.

RKI.—15,083k.c., 19.89m., Moscow. On some nights have heard this once regular transmitter at very good strength at 11.0 p.m.

RNE.—12,000k.c., 25.0m. This one is heard best at 7.0 a.m., but also heard at other times at good strength. (Foster, Keast, Lee, Gaden, Ford.)

RV96.—15,180k.c., 19.76m. At 4.0 p.m. this one is very loud. (Lee, Gaden, Foster.)

RV96.—9520k.c., 31.51m. Another very loud station at 7.0 a.m. (Foster, Ford.)

RV96.—15,400k.c., 19.49m. At 4.0 a.m. this one was coming in at great strength; also heard at 10.0 p.m. (Foster.)

RAL.—9600k.c., 31.25m. Only heard on two mornings at 7.0.

RV96.—15,230k.c., 19.7m. Good strength with Spanish session, 6.30 a.m.

READERS REPORTS

Mr. A. Lee (Dubbo, N.S.W.) sends us his usual monthly report and advises that he finds all bands good, excepting the 13 and 25 metre ones. In addition to all the usual stations which he heard at very good strength, Mr. Lee also mentions one or two mystery ones which, so far, he has been unable to identify. These have been included in our mystery panel.

Mrs. V. L. Gooma (Brisbane, Qld.) is another new contributor to our pages, and reports good reception in the north on her five-valve receiver. Have replied to your query by mail. Many thanks for kind remarks re this section.

Mr. P. G. Emery (Bathurst, N.S.W.) sends us his first reception report on conditions in his district, covering stations from 16 to 61 metres. Mr. Emery has recently obtained a new short wave receiver which should enable him to get an even more extensive log. A peculiarity of reception in Bathurst is the fact that some days stations will be loud, while on the next they are inaudible, making it difficult to gain an accurate idea of conditions.

Mr. Seth F. Horne (Newcastle, N.S.W.) advises that he has just received his verification from 2RO3 Rome, advising him that they would send monthly programmes also. By this time, Mr. Horne should also have received verifications from China, Philippine Is. and French Indo China.

Mr. P. H. Ford (North Rockhampton, Qld.) who sends us one of the most detailed reports we have so far received, has been having excellent reception in the northern State. We welcome Mr. Ford to our columns and hope that he will again be able to report on his reception, as this will be an invaluable guide to other Queensland listeners.

Mr. L. J. Keast (Randwick, N.S.W At various times during the month, M Keast has kept us informed of wh he has logged, and amongst oth items he mentions the great improv ment on the 19 metre band, which feels must be the forerunner of sur mer conditions, which we hope is t case, both from a listening and c matic standpoint.

Mr. M. Foster (Mount Vincent, N.S.W again sends us a helpful list stations he has received. The Germ stations, especially have been heard great strength in his locality. W have replied to your other queries b post.

Mr. D. McKinnon (Marrickville, N.S.W another new contributor whom we a pleased to know, has found thes notes helpful in identifying stations h has heard. As mentioned in our lette we will endeavor to adopt your sug gestion of mentioning when Englis is heard from the various stations.

Dr. K. B. Gaden (Thargomindah, Qld. Conditions in Queensland have bee very good, especially on the 49 metre band, where Dr. Gaden has logge some of the lesser-heard stations, in cluding a number of South Ameri cans. The 19 metre band is best a his location at 10.0 a.m., when man stations are heard. Yes, we agree i would be very helpful if the South Americans would stay on till 6 p.m. as they would be quite strong then.

Mr. B. W. Battis (Coraki, N.S.W.) sends us another interesting report covering his reception. Your station on the 19 metre band with English recordings would be YDC in Bandoeng, while the one on the 49 metre band is KZEG, as you correctly reported it. See article in this issue with regard to the many stations on this same frequency.

AFRICA

IABA.—9650k.c., 31.09m., Addis Abeba, Ethiopia. Have heard this one on most mornings till 6.0, and sometimes later.

EAJ43.—10,370k.c., 28.92m., Teneriffe, Canary Islands. Now heard at 6.0 a.m., and also on reopening at 7.30 a.m.

VQ7LO. — 6083k.c., 49.32m., Nairobi, Kenya. At 4.0 a.m. is very strong, and also quite good at 5.0 a.m.

CR7AA.—6137k.c., 48.88m., Lourenco Marques, Mozambique. Always a good station at 7.0 a.m. (Gaden.)

ZRH.—6007k.c., 49.94m., Roberts Heights, South Africa. Now only heard weakly in the early mornings. (Ford, Foster.)

Radio Tananarive.—6063k.c., 49.48m., Tananarive, Madagascar. Good strength, but distorted signal, on opening at 1.0 a.m.

TPZ2.—8960k.c., 33.48m., Algiers. Not heard very often, and when on the air the quailty is very poor. (Gaden.)

ITALY

2RO3.—9635k.c., 31.13m., Rome. Still one of the loudest stations on the 31 metre band in the mornings. (Lee, Ford.)

2RO4.—11,810k.c., 25.4m. Heard in the very early morning, and also at 8.0 a.m. (Ford.)

2RO6.—15,300k.c., 19.61m. This one is now quite weak in the mornings, and not nearly as good as last month. (Ford.)

2RO8.—17,820k.c., 16.84m. Only heard very weakly at 11.0 p.m. (Ford.)

2RO9.—9667k.c., 31.03m. Used in conjunction with 2RO3, but not quite as strong. (Lee, Ford.)

IRF.—9830k.c., 30.52m. One morning at 4.15 this one was heard at terrific strength.

IQY.—11,675k.c., 25.74m. Only a weak signal frim this Italian at 8.0 a.m.

2RO12.—15,100k.c., 19.87m. Heard at quite good strength at 7.0 a.m.

AUSTRALIA AND OCEANIC

VLR.—9580k.c., 31.32m., Lyndhurst. Our national short-wave station comes in at great strength during the daylight hours, and also in some parts at night. (Keast, Lee, Ford, Foster.)

VK2ME.—9590k.c., 31.28m., Sydney. On Sundays the Sydney experimental station is heard at good level. (Ford.)

VK3ME.—9500k.c., 31.5m., Melbourne. This Victorian station can also be heard at quite good strength in Sydney. (Lee, Ford, Foster.)

VK6ME.—9590k.c., 31.28m., Perth. Only heard at weak strength now in the eastern States. (Lee, Emery, Ford, Gaden.)

VK9MI.—6052k.c., 49.57m., M.V. Kanimbla. This ship transmitter comes in well at night around 10.0. (Keast, Lee, Emery, Ford.)

ZMBJ.—8840k.c., 33.94m., R.M.S. Awatea. Heard one Sunday afternoon conducting test with Sydney.

VPD2.—9538k.c., 31.38m., Suva, Fiji. At 9.0 p.m. this island station comes in at great strength at our location. (Emery, Ford, Foster, Gaden.)

FK8AA.—6122k.c., 49.00m., Noumea, New Caledonia. Heard on Wednesday and Saturday from 5.30 p.m. till 6.30 p.m. (Keast, Ford, Battis, Gaden.)

ZLT.—12,295k.c., 24.4m., Wellington, N.Z. This telephone circuit station was heard by Mr. Emery.

SWEDEN

SBT.—15,155k.c., 19.79m., Motala. Now only heard very weakly until closing at 7.15 a.m.

SBP.—11,705k.c., 25.63m. This one puts in a very nice signal every morning in conjunction with SBT. (Gaden.)

SBO.—6060k.c., 49.5m. On opening at 7.15 a.m. this one is very strong for about 30 minutes, then dies away. (Gaden.)

SBU.—9535k.c., 31.46m. Can only just be heard now, and almost impossible to identify except by comparing with SBO. (Gaden.)

INDIA AND ASIA

JZK.—15,160k.c., 19.79m., Tokio, Japan. Not heard at any great strength, but audible at 10.30 p.m. and also at 8.0 a.m. (Lee, Ford, Foster).

JZJ.—11,800k.c., 25.42m., same location. Heard in the early morning and at 11.30 p.m. (Ford, Foster).

JZL.—17,785k.c., 16.87m., same location. Can be heard at 8.30 a.m., and also at noon, but weak. (Ford.)

JVW3.—11,720k.c., 25.6m., same location. Comes in nicely with physical exercises at 7.0 a.m. (Keast, Foster, Lee.)

JLG3.—11,705k.c., 25.63m., same location. On the air in the morning until 7.0. (Ford.)

JLT2.—9645k.c., 31.11m., same location. Another Japanese station heard weakly until 7.0 a.m.

JLT.—6190k.c., 48.47m., same location. Heard on a few occasions weakly at 11.0 p.m.

SHORT WAVES

DY.—9925k.c., 30.23m., Darien, Manchukuo. Still being heard every night on opening at 10.0. (Lee, Ford, Foster.)

MTCY.—6125k.c., 48.98m., Hsinking, Manchukuo. Now being heard very strongly every night as early as 9.0. (Lee, Gaden, Keast.)

MTCY.—11,775k.c., 25.48m., same location. This is the new frequency being used by this station, as reported elsewhere. (Ford, Foster.)

JFO.—9635k.c., 31.13m., Taihoku, Taiwan. Still being heard every night, and a little stronger than last month.

KZIB.—9500k.c., 31.58m., Manila, Philippine Is. Being heard at very good strength now. (Emery, Foster, Lee, Ford, Keast, Battis.)

KZIB.—6040k.c., 49.67m., same location. This is the new frequency being used in conjunction with 9500k.c. (Lee, Battis, Gaden.)

KZRH.—6110k.c., 49.1m., same location. "The Voice of the Philippines," now being heard nightly at fair strength. (Keast, Lee, Ford, Gaden.)

KZRM.—9570k.c., 31.35m., same location. "Radio Manila," is now very strong, both at night and also on opening at 7.30 a.m. (Emery Battis, Ford, Lee, Foster.)

KZEG.—6140k.c., 48.86m., same location. "The Sunshine Station," very strong every night. (Foster, Keast, Ford, Battis, Gaden.)

KZRF.—6140k.c., 48.86m., same location. "Radio Philippino," another Manila station heard on same frequency.

KZRM.—6140k.c., 48.86m., same location. "Radio Manila" also occasionally uses this frequency. As stated in article, we think the actual station is KZRM, as this seems to be the most frequently used. (Lee, Foster.)

KAY.—14,980k.c., 20.03m., same location. Heard one night at 10.30, with special programme for Berlin.

YDB. — 9550k.c., 31.41m., Bandoeng, Java. Heard at night, but only weakly at our location.

YDC.—15,150k.c., 19.81m., same location. Again being heard at full speaker strength at night, and also well in daytime. (Emery, Keast, Battis, Ford, Lee, Foster.)

YDD. — 6045k.c.. 49.63m., Bandoeng, Java. Heard every night, but now interfered with by KZIB. Notice new call and corrected location.

YDX.—7220k.c., 41.55m., Medan, Sumatra. Native programme till 11.15 p.m., then usual N.I.R.O.M.

PMH. — 6720k.c., 44.64m., Bandoeng, Java. Another station which gives native type programme exclusively. (Lee, Ford, Foster.)

PMN.—10,260k.c., 29.24m., same location. Can be heard nightly, but not particularly strong. (Lee, Ford, Foster.)

PLP.—11,000k.c., 27.27m., same location. At some locations this station comes in at full speaker strength, while at others it is rather weak. (Foster, Ford.)

PMY.—5140k.c., 58.31m. Another Bandoeng station on the higher wavelengths which gives some very good items nightly. (Lee.)

ZHP.—9690k.c., 30.96m., Singapore. S.S. Always a good signal from this Malayan station. (Lee, Ford, Foster, Gaden.)

ZHJ.—6080k.c., 49.3m., Penang. S.S. A very powerful station now until closing at 11.40 p.m. (Keast, Lee, Ford, Battis, Gaden.)

XYZ. — 6007k.c., 49.94m., Rangoon, Burma. Not very strong, but heard every night until after midnight.

HS8PJ.—9510k.c., 31.55m., Bangkok, Siam. Quite a nice signal from this Siamese station four nights a week. (Foster, Ford.)

XGOY.—11,900k.c., 25.21m., Chungking, China. This powerful Chinese heard at 8.0 a.m., and also 9.0 p.m. (Emery, Foster, Battis, Ford, Lee, Keast.)

XMHA.—11,850k.c., 25.32m., Shanghai, China. This American-owned station heard nightly on the 25 metre band. (Foster, Ford.)

XPSA.—7000k.c., 42.8m., Kweiyang, China. Another powerful Chinese station heard nightly till after midnight. (Lee.)

XGOK.—11,810k.c., 25.4m., Canton, China. Still moving around in the vicinity of 11,810k.c. Heard at 11.30 p.m.

XTC.—9295k.c., 32.28m., Shanghai, China. Only heard at the end of July, and then opened at 11.0 p.m.

XGOX.—17,800k.c., 16.85m., Chungking. Heard best around midday.

XJOD.—6880k.c., 43.6m., Hankow, China. Heard best at 10.0 p.m. (Foster, Ford.)

"Radio Boy Landry."—9675k.c., 31.01m., Saigon, Indo China. On August 7 came in very well till closing at 12.45 a.m. (8th).

ZBW3.—9525k.c., 31.5m., Hongkong, China. Now a very strong station on the 31 metre band every night. (Lee, Ford, Foster.)

Radio Saigon.—6116k.c., 49.05m., Saigon, French Indo China. Now giving an English session from 9.0 p.m. till 9.45 p.m., and being one of the loudest on the band. (Keast, Emery, Gaden, Battis, Ford, Lee, Foster.)

Radio Saigon.—11,780k.c., 25.47m., same station. On this frequency is also very strong at 11.30 p.m. (Keast.)

VUD2.—9590k.c., 31.28m., Delhi, India. Opens nightly at 10.30, at quite good level. (Emery, Lee, Foster, Gaden.)

VUD3.—15,290k.c., 19.62m., same location. At 1.0 p.m. this station can easily be followed in native programme. (Emery.)

Radio Hanoi.—11,910k.c., 25.19m., Hanoi, F.I.C. This Indo Chinese reported at R8 at his location, Emery.

VUD2.—4960k.c., 60.48m., Delhi. Heard at fair strength at 11.0 p.m. (Gaden, Lee.)

VUM2.—4920k.c., 60.98m., Madras. Also only fair at 11.0 p.m. (Lee, Gaden.)

VUB2.—4880k.c., 61.48m., Bombay. Another Indian heard same time. (Gaden, Lee.)

VUC2. — 4840k.c., 61.98m., Calcutta. This was the best of the Indian stations on the higher wave-lengths. (Lee, Emery, Gaden.)

NORTH AMERICA

W1XK.—9570k.c., 31.35m., Boston, Mass. Only heard this one weakly at 9.0 p.m. and badly interfered with by KZRM.

W2XE.—17,830k.c., 16.83m., New York, N.Y. Can be heard weakly at 11.0 p.m. (Emery Ford.)

W3XL.—17,780k.c., 16.87m., same location. On opening at 8.0 a.m. is quite fair and also heard weakly at 11.0 p.m. (Gaden.)

W3XAL.—9670k.c., 31.03m., same location. Heard best in the afternoon till 3.0 p.m. (Emery.)

KGE1.—15,330k.c., 19.57m., Treasure Island. Now being heard daily until about 2.15 p.m. (Gaden.)

KGE1.—9530k.c., 31.48m., same location. Popular "Western Voice of Electricity" comes in well around 4.0 p.m. and also by 11.0 p.m., some nights better than others. (Emery, Battis Ford, Lee Keast, Foster.)

WTIP.—11,870k.c., 25.27m., Pittsburg, Pa. Can be heard at 8.0 a.m. and again at 1.30 p.m. Notice new call letters, formerly W8XK (Foster, Lee, Ford.).

WTIP.—15,210k.c., 19.72m., same location. This one opens at midnight and can be copied at fair level. This station has also changed its call from W8XK to WTIP (Keast.)

WLWO.—6060k.c., 49.5m., Cincinnati, Ohio. Now being heard much better around 9.0 p.m., also at 4.0 p.m. (Foster, Gaden, Keast).

WGEO.—9530k.c., 31.48m., Schenectady, N.Y. Can be heard very weakly at 8.0 a.m., also at 1.0 p.m (Keast.)

WGEA.—15,330k.c., 19.57m., same location. Can be heard faintly at 7.30 a.m.

W1XAR.—11,730k.c., 25.58m., Boston, Mass. Heard faintly Mondays. (Gaden.)

KKZ.—13,690k.c., 21.91m., Bolinas, Cal. Gives a special programme to Hawaii on Sundays till 2.45 p.m. (Keast, Ford.)

XEXA.—6175k.c., 48.58m., Mexico City, Mexico. Have heard this one again on two nights opening at 11.0 p.m., instead of 10.30 p.m. (Gaden.)

XEWW.—9500k.c., 31.5m., same location. This well-known Mexican can be heard best on a Sunday afternoon. (Gaden.)

XEWW.—15,160k.c., 19.79m., same location. Mr. Emery reports this station at R9. (Ford.)

XEUZ.—6117k.c., 49.04m., Mexico City, Mexico. Another Mexican station heard by Mr. Emery at R6, also by Dr. Gaden, but at his location was only headphone strength.

SOUTH AMERICA

CXA6.—9620k.c., 31.19m., Montevideo, Uruguay. Still being heard in the mornings at quite good strength around 7.0 a.m.

CXA8.—9640k.c., 31.12m., same location. Heard best on a Sunday afternoon until about 4.0 p.m.

CXA2.—9570k.c., 31.35m., same location. On Sunday morning, August 6, this one was very good at 7.0 a.m., with lady announcer. (Gaden.)

LRX.—9660k.c., 31.06m., Buenos Aires, Argentine. Can be copied in the mornings at 8.0 a.m. and also in the afternoons until 2.30 p.m.

LRA1.—9690k.c., 30.96m., same location. Heard best one Saturday morning, opening at 7.0 a.m.

LRA1.—17,830k.c., 16.83m., same station and location. New one heard on Saturday mornings at 7.15 a.m.

OAX4J.—9340k.c., 32.12m., Lima, Peru. Comes in at quite a good level on a Sunday afternoon until 4.0 p.m. (Gaden.)

OAX4T.—9566k.c., 31.38m., same location. Can still be heard opening at 11.0 p.m. with march.

OAX5C.—9350k.c., 31.95m., Ica, Peru. Only heard on a Sunday afternoon until 3.0 p.m. (Gaden.)

OAX4Z.—6077k.c., 49.37m., Lima, Peru. Heard by Dr. Gaden at fair strength on Sunday only at 5.0 p.m.

CB960.—9600k.c., 31.25m., Santiago, Chile. Heard at night from 10.0 p.m., in afternoons till 3.0 p.m., and also till closing in mornings at 7.30 a.m. (This was our mystery station of last month on 9600k.c.)

CB1170—11,700k.c., 25.64m., same location. Heard occasionally on Sunday till closing at 2.0 p.m.

CB1180.—11,970k.c., 25.06m., same location. Heard very well till closing at 2.0 p.m.

CD1190.—11,910k.c., 25.19m., Valdivia, Chile. Another Chile station heard until closing at 2.0 p.m. with bugle call.

CB970—9710k.c., 30.91m., Valparaiso, Chile. This one can be heard opening at 8.30 a.m. Lady and gent announcers.

HCJB.—12,460k.c., 24.08m., Quito, Ecuador. Only heard very weakly now around 10.30 p.m.

ZP14.—11,730k.c., 25.58m., Villarica, Paraguay. Heard again on two mornings at 8.30 a.m., but rather weak. (Gaden.)

PRA8.—6015k.c., 49.87m., Pernambuco, Brazil. Can still be heard opening at 7.0 a.m., just above DJC. (Gaden.)

PSH.—10,220k.c., 29.35m., Rio de Janeiro, Brazil. Can be heard faintly on opening at 9.0 a.m.

HJ1ABG.—6042k.c., 49.65m., Barranquilla, Colombia. Dr. Gaden heard this Colombian one Sunday at 5.30 p.m. This must have been a special transmission, as their allotted frequency is now 4905k.c., 61.16m.

MYSTERY STATIONS

ONCE again we have quite a bunch of unidentified stations heard during the last month. From last month's list we can remove two stations as follows. The one on 15,230 kc is OLR5A, and the one on 9600 kc is CB960. The new ones are:

8880 kc 33.8 m. European heard till 5.30 a.m.

8980 kc 33.41 m. Foreign station heard till closing at 4.30 a.m.

9693 kc 30.95 kc. Heard on Monday morning only from 7.30 a.m. Good strength. (Lee.)

12,230 kc 24.53 m. Japanese station heard weakly at 11.0 p.m.

15,040 kc 19.95 m. Another Japanese station with same programme as one on 24.53 m. Closes at midnight. (Lee.)

7210 kc 41.6 m. Weak station heard in the early morning.

Any information regarding these stations or those published in previous months will be appreciated, and will be to the benefit of all readers, as a help in identifying them.

CENTRAL AMERICA AND WEST INDIES

COCQ.—Havana, Cuba. This station has still not settled down, but is usually in the vicinity of 8830k.c., 33.98m., and can be heard in afternoons, also at 10.0 p.m. (Ford, Gaden.)

COBC.—9985k.c., 30.05m., same location. Heard very well every night, from 10.0 onwards, and sometimes earlier. (Ford, Foster.)

COJK.—8685k.c., 34.54m., same location. On the air every night just before 10.0. (Gaden.)

COBZ.—9028k.c., 33.24m., same location. Comes on the air at 10.45 p.m., but is very weak, and soon fades out.

COCH.—9437k.c., 31.79m., same location. Not heard as well as a few weeks ago, but best in afternoons until 3.0.

COCM.—9850k.c., 30.46m., same location. On some nights this one is quite good strength. (Gaden.)

HP5A.—11,700k.c., 25.64m., Panama City, Panama. Opens nightly at 10.0, with fair signal. (Gaden.)

HP5K.—6005k.c., 49.95m., same location. Occasionally heard at 10.0, opening with the "Merry Widow." (Gaden.)

HP5J.—9590k.c., 31.28m., same location. This one is best at night, but can also be heard in the afternoons on some occasions. (Gaden.)

TIPG.—9620k.c., 31.19m., San Jose, Costa Rica. Becoming louder now on opening at 10.0 p.m. One of the best on the band at that time. (Foster.)

TILS.—6165k.c., 48.66m., same location. Still being heard every night, opening at 10.0. (Gaden.)

TGWA.—9685k.c., 30.98m., Guatemala City, Guatemala. Comes in best in their DX programmes on Sunday afteroons. (Emery, Ford, Foster, Keast.)

TGWB.—6490k.c., 46.19m., same location. Also heard at fair strength in their Sunday afternoon programmes. (Foster, Battis, Gaden.)

TG2.—6190k.c., 48.47m., same location. Only heard on Sundays, when it is audible at quite good level. (Gaden.)

MISCELLANEOUS

PCJ2.—15,220k.c., 19.71m., Huizen, Holland. Best transmission is on Tuesday afternoon, starting at 4.0. (Lee, Foster, Ford.)

PHI2.—17,770k.c., 16.88m., same location. Only heard very weakly around 11.0 p.m.

LKQ.—11,740k.c., 25.55m., Oslo, Norway. Comes in at quite good strength at 5.30 a.m. and also later.

LKV.—15,170k.c., 19.78m., same location. Heard best at 10.30 p.m., also quite good strength at 7.0 a.m.

LKJ.—6130k.c., 48.94m., same location. Now heard with a much improved signal at 7.0 a.m. (Gaden.)

SP19.—15,120k.c., 19.84m., Warsaw, Poland. Heard weakly in the mornings, opening at 9.0. (Gaden.)

OIE.—15,190k.c., 19.75m., Lahti, Finland. Still being heard with weak signals around 7.0 a.m.

OFD.—9500k.c., 31.58m., same location. This station is heard best at about 4.0 a.m., when it is quite good strength. (Ford, Gaden.)

YUA.—6100k.c., 49.18m., Belgrade, Yugoslavia. Heard at good strength from 5.0 a.m. onwards till about 7.30 a.m. (Gaden.)

EAQ.—9860k.c., 30.44m., Madrid, Spain. Now audible every morning around 7.0. (Foster, Lee.)

OLR5A.—15,230k.c., 19.7m., Prague, Bohemia. As reported last month, can now be heard daily till closing at 1.0 p.m.; best at 7.30 a.m. (Gaden.)

CSW7.—9735k.c., 30.81m., Lisbon, Portugal. On the air every day till 9.0 a.m. at quite good strength. (Gaden.)

CSW8.—7260k.c., 41.3m., same location. Now coming in at excellent level till 8.0 a.m. (Foster, Lee, Ford, Gaden.)

CS2WD.—5977k.c., 50.2m., same location. Another Portuguese station, heard in the early mornings around 7.0 a.m. (Gaden.)

ZAA.—6085k.c., 49.3m., Tirana, Albania. Still being heard till closing at 7.15 a.m.

(Continued on Page 77)

NEW STATIONS

EACH month in this panel we will list all stations, definitely identified, which have not been previously heard, either at our own location or by our readers.

KC	Metres	Call	Location	
6,040	49.67	KZIB	Manila.	Philippine Is.
11,775	25.48	MTCY	Hsinking.	Manchukuo.
15,205	19.73	MTCY	Hsinking	Manchukuo
17,830	16.83	LRA1	Buenos Aires	Argentina
9,700	30.93	DXB	Berlin	Germany

by Barry Kent

MAGIC AND MAGICIANS

PASTIMES of OLD INDIA

Well, this is a surprise. Last month when I wrote about "The Indian Rope Trick," I was under the impression that everybody knew or had heard of this baffling mystery.

To my surprise, several readers have since written asking me to tell them the effect of this elusive and ancient trick of the East. Briefly, it may be described in a few words.

The performer takes a coil of thick rope and throws one end into the air, where by some mysterious means the end remains suspended in midair without visible means of support. A small boy assistant is then commanded by the yogi to climb the rope; this he does to its highest point, where he remains for a few moments, then suddenly and completely disappears. The performer now takes a sword or large chopper and cuts the rope down. The legs, arms, trunk and head of the boy, all disjointed, fall to the ground at the feet of the magician, who, by his incantations, causes the pieces to reassemble, and the boy walks off apparently none the worse for his experience. All this is supposed to happen out in the open with the audience completely surrounding the performer. So much for "The Indian Rope Trick."

DAPHNE SMITH

Meet little MISS DAPHNE SMITH, aged 7, who only a few weeks ago in London, appeared before over 400 members of the Magicians' Club, and mystified them with her superb magic and mystery. Daphne has all the assurance of an experienced performer many years her senior, and it is predicted that a successful career as a magicianess is certain to follow. Her opening patter is delivered confidently. As she walks on to the stage, she says: "My daddy is a conjurer and this is what he does"—and then proceeds to give her twenty-minute performance, in a manner that astounds her onlookers.

THE MANGO TREE

Now let us turn to another trick with a reputation almost as spurious. "The Mango Tree Trick," from a strictly technical point of view, is probably the worst performance of the Indian conjuror, and, from a purely psychological point of view, the gullibility of the audience is astounding.

Perhaps I had better give you a description of the trick first. The magician squats down on the ground out in the open, usually surrounded by a crowd of onlookers. He produces a mango tree seed and puts it under some loose earth gathered from a nearby garden, then begins to play his flute. The seed begins to sprout until about two inches high—a little water—more playing, and the little plant grows higher and higher until it is about two feet high. Then, more water—more playing, and up it shoots to about four feet at its highest, with fruit appearing, which is plucked and handed to nearby members of the audience to eat.

STAGE PERFORMANCE

On a stage presented by a modern magician, this can be done quite easily—it can even be improved upon, but out in the open, as it is described, I am afraid much has been added to the story. Of course, I have no doubt that the trick IS performed in a limited way by many Indian and other performers. I have seen it done—I can do it myself, and the trick is very effective, but I still doubt most of the stories told of this mystery of mysteries. Frankly, if I were to give an explanation of HOW it is done, it would only rob those of you who like to imagine that "magic" and "magic" alone is responsible for the mysterious growing of a mango tree, leaves, fruit, and all. It is really amazing that such a simple and easy trick should have gained the reputation it has. "The Mango Tree Trick" IS done, but much has been added to the effect in retelling and retelling. In other words, it has a past to live up to. Present-day magicians see to it that nothing is lost in the presentation of the trick, and full advantage is taken of its historic and ancient past, and the stories that have added romance and lustre to the mystery have become almost part of the mystery itself.

Hey! Presto!

Abracadabra!

Spring greetings to you Magicians!

Spring is the time for Magic! And now is the time to get your new programmes ready for the coming Christmas season, for Magic this year is going to be bigger, brighter and better than ever. For the semi-professional again there will be more work than there are magicians to fulfil engagements. Competition will be keen, and many magicians are already buying new overseas tricks in anticipation of better times.

It is indeed pleasing to receive so many letters from my New Zealand readers. Every mail from N.Z. brings me a bundle of letters from interested friends over there. To the many who have asked me about Magicians' Clubs in New Zealand, I would suggest you get in touch with Mr. C. Henderson, P.O. Box 1859, Auckland, C.I., N.Z., who is the editor of "Te Tohunga" the magazine of N.Z. Magicians. From all I hear too, they are a very live body of enthusiastic performers. "Te Tohunga" is published quarterly and is well worth reading if you are interested in magic as a hobby. "CHANG" mentioned to me on his way through Sydney, what a wonderful bunch of boys they are—so New Zealandite, get acquainted with your own club, and work hard for the betterment of magic and magicians now.

In this issue is published a photograph of the girl ventriloquist I spoke of in our last issue. She called on me during the week, and gave me a private audition of her art. If YOU are a performer like this, either with Magic or Ventriloquism, send me your photograph too, we may be able to publish it some time.

For personal written replies, don't forget the 2d stamp and self-addressed envelope.

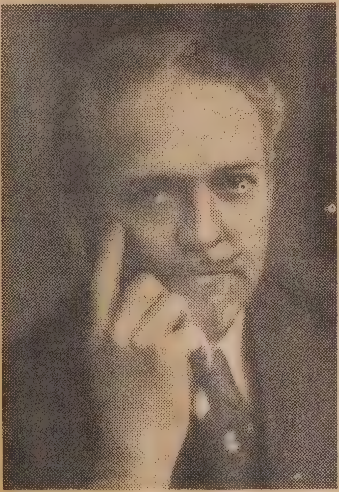
With best wishes, Magically yours,

Barry Kent.

WHO'S WHO IN MAGIC

DANTE

IN commencing to write a paragraph about DANTE, frankly I do not know exactly where to begin. Having seen his great show, "Sim Sala Bim," so many times, having talked with him on so many occasions, knowing his tricks, his methods, his dynamic personality, his great driving force, his showmanship, his business ability, his organising capacity, and all this gives me so many points where I should start that I cannot select his best point first. DANTE is just GREAT in all departments of his gigantic "Sim Sala Bim" magical production. A man who lives the part of DANTE 24 hours of the day is he, and a person who can draw swords with any, on magic topics. DANTE looks a real magician, both on and off the stage—he has "glamor."



DANTE

DANTE has been over 40 years in magic, and his biggest successes come at the end of his career in England, where he has appeared now for some years. Appearances and re-appearances at the leading theatres all over England have been the general rule—his success has been phenomenal. Correct name is Harry August Jansen. As far back as 1902 DANTE had a full evening show, and he appeared in Australia several times, both as JANSEN, and on his last visit as DANTE. It is this vast experience of 40 years in magic, its ups and downs—and he had many downs—he gathered power and a business ability that took him to great heights as a really great magician. Productions like "Sim Sala Bim" and magicians like DANTE is the best propaganda for magic and magicians in existence.

The photograph of DANTE published on this page is not a recent one of him, but it has never been published in Australia before. Later on, I will give you his latest photograph taken almost on the eve of his retirement from magic—just about the time of his handing over to his successor, DANTON . . . and we expect much of DANTON in the future. Australian magicians and friends say "hats off" to DANTE, and best of good wishes for his future happiness. "Sim Sala Bim."

FAMOUS CHINESE MAGICIAN

TEM-PO-LO SAM

Here you see Tem-Po-Lo Sam, a Chinese magician at present in Sydney, on holidays.

It is doubtful whether Tem-Po-Lo Sam will appear here professionally, but from the talks I have had with him, and from the unusual experiments in magic I have seen him perform at close quarters, it will be a pity if other magicians and the general public are not permitted to see his puzzling act. The well-known cups and balls is a masterpiece in his hands.

Then there is an unusual trick done with white mice, producing, changing and multiplying in a mystifying manner, finishing up with a production of large number of mice in a previously examined empty Chinese chest about ten inches square.

THROW YOUR VOICE

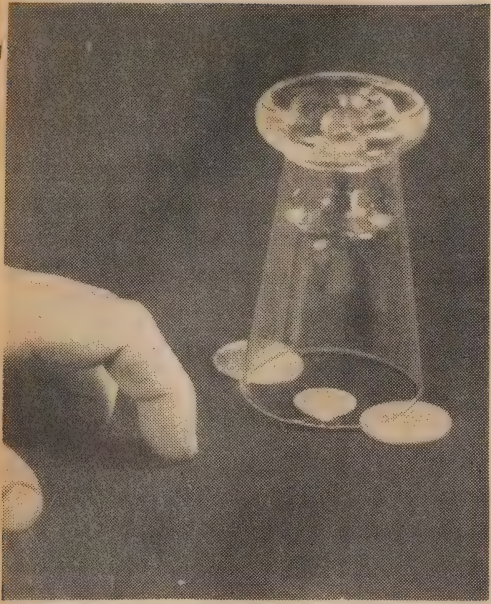
TAKE ME OUT!!
??
HELP!!
LOAFER

into a trunk, under the bed—anywhere.

THE VENTRILO

An instrument fits into the mouth; cannot be detected. With the aid of this Double throat of VENTRILO you can imitate birds, animals, etc. Everything for ONE SHILLING, including a FREE booklet giving you full instructions how to become a Ventriloquist and throw your voice.

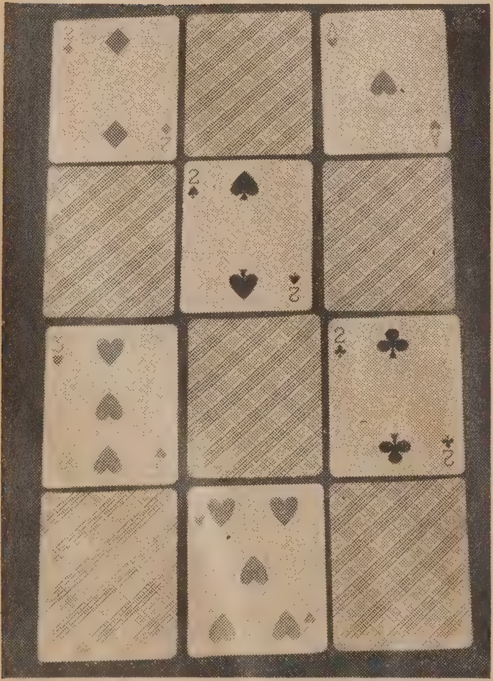
Will Andrade BOX 3111P, G.P.O., SYDNEY, N.S.W.



THE COIN THAT WALKED!

Place a sixpence on the tablecloth and cover it with an inverted tumbler balanced on two pennies as shown. Ask somebody to get the sixpence out without poking it with anything, or blowing it or attracting it with a magnet. No, it cannot be done. Yet YOU merely call it and out it comes. HOW? Merely scratch the tablecloth with your finger nail near the tumbler . . . and . . . out it comes—Hey, Presto!

* * *



BAFFLING PUZZLE FOR CARD TABLE

Here are four rows of cards—three in a row. PROBLEM : Without touching more than one card, see if you can make the 1st and 3rd rows ALL FACE CARDS and the 2nd and 4th rows all BACKS. (Reading from the top row, down). SOLUTION : The only card you need to TOUCH is the centre TOP card. Move it up and around to a osition just under the entre card of the iddle column. Then ush up the entire iddle column until the ards are even—backs nd fronts. You have nly TOUCHED one card.

HOW TO THROW YOUR VOICE

Ventriloquism, or the art of "throwing the voice," has been referred to in Gregory's "Dictionary of Arts and Sciences" as an art by which certain persons can so modify the voice as to make it appear to the audience to come from any distance.

Here the whole secret of ventriloquism is in the words "make it appear," that is the voice apparently comes from one direction—usually a doll—whereas, the voice in a different tone, comes from the performer. If you have read any books on the art of ventriloquism, I would stress the point, and ask you not to strain the throat in any of your exercises. Take special care with your voice. D not strain or tire your throat. You wil need to breathe through the nose always, right from the very first lesson. Stand in front of a mirror, and, withou moving any muscles of the face and lips, try and say a few words in your usual voice. The lips, of course, should be slightly apart .

BEGIN WITH VOWELS

Begin by saying over and ove again, as distinctly as possible all the vowel sounds: A E I O U, a naturally as you can, without moving the lips or other face muscles. Then try the other letters of the alphabet and continue with short sentences. D not expect perfection too soon, practice is necessary if you are to succeed. I would take up too much space to give you a full course of lessons on ventriloquism in this journal, but if you are interested, and will send me a stamped envelope for reply, I will give you further particulars regarding the names of helpful books dealing with ventriloquism an any other information you may wish. Of course, before you go very far wit this hobby, you will need a ventriloquia doll, and, here again, I may be able t advise you if you care to drop me a note. Suitable dolls are not expensive, and i you decide to follow this art, one is very necessary.

USING A DOLL

A doll will help you very much in overcoming nervousness if yo are affected in this way. At first you may have difficulty in saying words commencing with letters like B and V therefore, when any of these letters occu in the dialogue, a slight change has t be made in their sound. This does no matter, as in most instances the "voice" of the doll is spoken in some dialect. I is a good plan to listen to distant noises and sounds, and try to reproduce them yourself as you hear them. Later on, I will give you further information about ventriloquism and polyphonism.

Talented Girl Ventriloquist

Here you see Miss Ruth Thompson, of Forest Road, Hurstville, a popular reader of "Radio and Hobbies," who, at the age of eleven, is quite an accomplished ventriloquist.

Ruth Thompson.

SHE has appeared at school concerts and house parties with great success. Her partner is named "Danny," and the dialogue between Ruth and her friend is written and composed by Ruth herself. Over five complete changes of programme is the repertoire of this little entertainer—think of it, nearly an hour of ventriloquial entertainment which has the audience laughing from the time she walks on to the stage until she leaves. Her ambition is to own a full size ventriloquial doll of her own—and from what I hear, this will not be long now. Best of luck, Ruth, with your hobby.

MATHEMATICAL PROBLEM

ANSWER TO PUZZLE IN AUGUST ISSUE

DID you have much trouble working out the length of the tape measure mentioned in the puzzle last month? Here is the correct answer for those who could not solve the problem.

Answer: The tape should be cut at the 13½-inch mark. One piece would be 13½ inches and the other 22½ inches long, the former being three-fifths the length of the latter.

MAGIC NEWS

THE FIVE DEMONS — A NEW TRICK — ACCIDENT TO JOBINI

LAST month, you will remember, I gave you a page of information about Sydney's Mystery Club, "The Five Demons." On July 12 I had the extreme pleasure of being present at a special performance organised by these magicians in aid of the N.S.W. Chinese Women's Relief Fund at the Chinese Masonic Hall, Sydney. Magic was certainly in the air on this occasion. The hall was packed to overflow, and I have since heard that the financial success of the show was greater than any other previously held at this hall. It is particularly pleasing to know that our hobby, Magic, was responsible for this great success.

* * *

A NEW trick arrived in Australia during the month, and is taking the local magicians by storm. Rooklyn demonstrated it for me, and it is certainly a puzzling effect. It is called "The Anti-Gravity Glasses." Two glasses are borrowed and given a thorough examination. The performer takes a handkerchief, folds it twice, and places it on top of the book. The glasses are placed on top of the handkerchief mouth down and about an inch apart. Magician now takes hold of the book with one hand and slowly turns i upside-down. The glasses, however, do not fall. They seem to defy the laws of gravity and remain firmly attache to the book—some invisible strange force holds them. Now a spectator is invited to remove the glasses himself, one a a time, and immediately examine glasses book and handkerchief. It puzzled me

* * *

A WEEK or so ago a painful acciden occurred to Jobini, the well-known Sydney magical entertainer, whilst performing a fire-eating trick. His mouth and tongue suffered somewhat by the heat of the experiment; however, little damage was done, and he was able to finish his performance that evening This reminds me to impress on you al the importance of exercising great care when you perform such tricks. In fire eating, breathe inwards through the nose and outwards through the mouth Chemical tricks are also in the list o those you should pay especial care to in their preparation and presentation.

SECRET ART OF VOICE THROWING EXPOSED FOR THE FIRST TIME

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WINTER

☆

JUNE to August are doldrum months for cine photographers.

The amateur's cine activities are usually confined to the showing and re-showing of the summer shootings, or, in only too small a majority of cases, to editing and bringing up to date the old reels of film.

Every camera house reports a falling-off of business in the dark months of the year. Color film sales in particular drop considerably, and monochrome comes into its own. Yet even black and white does not attract as in the brighter months, and it seems a rooted conviction among amateur cine enthusiasts, that grey skies, lowering clouds, and icy winds must mean bad pictures.

On the contrary, some of the most beautiful films of the year are shot during this winter season.

Naturally, this includes snow shots.

Remember that sunlight is necessary to bring out the best in your snow filming Two warning hints—the brilliantly-lit snow can double the strength of the light, so watch your exposure carefully. And take along a yellow or red filter to give that added spice to your snow pictures.

The real enthusiast can find something new for his camera, no matter what the season, or the weather conditions. The winter months have a beauty all their own, and many of these are recaptured by intelligent use of exposure, and choice of subject. Where there is snow to be found, no one need be at a loss for the opportunity to make particularly striking pictures.

Another perfect example of what sunlight can do to a snow picture. Note the back-lit snow tracks and the clever use of shadows on the white surface. Filmed on a dull cloudy day, this picture would have a flat bleak monotony that would rob it of all beauty.

PHOTOGRAPHY BRINGS NEW OPPORTUNITIES

for cine enthusiasts

By
FRANK EASTMAN

But it is not every amateur who can afford to chase the snow. Therefore, we shall leave this phase of winter filming for a moment and touch upon the dozen and one other beauties made to order for our cameras.

The trouble with winter beauty is that, like all true loveliness, it must be sought. Summer's charms are spread before us, bright, flamboyant, exhibiting themselves and inviting our cameras. But winter's charms are more shy. We need pictorial imagination, plus extraordinary patience to capture them. But like all things hard fought, their value increases a hundredfold. They are a rarity.

This article is therefore a guide to those workers who wish to continue their filming throughout the winter, but are assailed on every side by questions. Shall I use color? Will the weaker sunlight mean exposure troubles? What about filters? Are snow pictures hard to obtain? What will I film?

WHAT TO FILM?

Let us answer the last question first. You will film anything that attracts your eye sufficiently to wish that you could recapture its beauty forever. An example? Coming across from Manly recently, the writer witnessed a winter sunset such as only occurs on those days when one doesn't carry a camera! The Harbor Bridge was silhouetted against a blaze of pale gold and amber, it was reflected on the water until we seemed sailing through a sea of gold. Gradually, as the sun sank, the gold changed to scarlet, and every window of the city skyscrapers glowed like blood-red torches. From scarlet to sullen red and pink, and then through glorious shades of purest pastel, the sun went down. The whole glorious pageant had taken little more than six minutes, and had it been recorded on color film, I venture to suggest that this would have been the most prized reel in Australia.

So, by all means, film winter sunsets. And film them in color.

STREET REFLECTIONS

If you think color film is the property of summer time only, you should have seen some shots made recently of William-street on a wet night. The glistening road and pavements reflected every color of the myriad Neon signs, smearing them wantonly across the road, running greens into scarlets, and golds into blues. Use a 1.9 lens opening here. Three point five openings are useless, and will result in nothing more than a dark blurr of under exposure.

Leaving color and passing to monochrome, we find that winter opens a new album for us. And why not black-and-white? Isn't this the season of black naked trees standing against cloud-banked skies, of dark, scurrying figures disporting in the snow and the black hulks of ships ploughing through grey waters.

Now is the time to make those pictures, which have all the cold, austere beauty of an etching. Naturally, you'll want to watch your exposure. The metre, which you shunned in the summer, when blue skies and sunshine made it unnecessary, must be brought out now, for it will prove a good friend indeed. Over-exposure is the greatest enemy of good winter pictures, and it can produce flat, glaring areas that are quite devoid of detail. And, of course, you will use a color filter.

Particularly for your cloud effects.

Cloud effects are one of the many things that make winter filming worth while. When the chill wind sends clouds piling into castellated masses into the sky, backlit with the cold rays of the sun, then there is an effect worth waiting for. A yellow filter for ordinary use, certainly. But if you want the drama of a black sky to show off those fleecy giants, a red filter should be your choice.

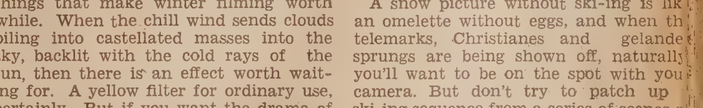
And if you contemplate snow pictures, a yellow and red filter are as necessar as the film in your camera.

Good winter sports reels are scarce The weather is uncomfortable, but mor important, Australia's snowfields are b no means easy of access or financiall within the reach of everyone's pocke However, if you are among the fortunat in a position to holiday at Buffalo o Kosciusko, here are some tips learn from sad experience.

WINTER SPORTS

Direct sunlight and filters are essential to snow filming. One often hears tal of beautiful back lighted ski shots, adorned with a halo of powdery snow glittering in the sun, but one rarely sees then on the amateur screen. Since there i nothing on the screen as flat and a drab as a winter scene made on a dul overcast day, you simply must wait fo sunlight to get good snow pictures. Sno highlights and shadows disappear wit the sun and your camera should do likewise.

A snow picture without ski-ing is lik an omelette without eggs, and when th telemarks, Christianes and gelande sprungs are being shown off, naturally you'll want to be on the spot with you camera. But don't try to patch up ski-ing sequence from a series of scenes c the actual competition. In these, th action must necessarily take place i long shots, and very likely the lightin will be poor, since slalom and downhi



Wet weather reflections filmed in color, bring forth all the multi-colored beauty of street signs and shop windows. Use a 1.9 opening, however, and a special type of Kodachrome film.

WINTER FILMING

(Continued from Page 63)

ourses are usually laid out on northern xposures.

Therefore, while it is wise to film a ertain footage of the competition to ut in at suitable intervals, concentrate on close-ups and mid-shots made eparately after the competition. You vill find that the sportsmen are only oo willing to co-operate with you, especially after a promise of a later creening. For it is the salvation of he amateur cine enthusiast that "everyne wants to see themselves on the pictures."

Open your picture with the long, aborious climb, and follow this with a ew close-ups at the starting-point. Beore one can ski, bindings must be djusted and wax applied. Very well—ilm it! A close-up of the timer's watch, hen the first breath-taking swoosh as he skier starts. And don't shoot this tart at right angles, unless you want nothing but a blurred jitter to record n your film. An angle of 25 or 75 legrees will produce excellent results. and, remember, you can get the graceul descent of the professional skier nuch more accurately if you shoot low motion.

THREE MAJOR RULES

So, whether you film a bank of massed louds, a snow fight, a winter sports ontest, or a hike across bare hills, remember these three rules for smoothly ontinuous and pleasing presentation:—

Be clear.

After long shots, which establish the scale and general action, follow with lose-ups which show dramatic and picorial details.

Be chronologically progressive.

Don't show a snow-man, first, in perect condition, then horribly dismembered, and, the next instant, fully restored in a different location. Don't ilm a young lady hiker striding round bend in a pair of blue serge slacks, and, the next moment, present her oming down a road in a flowing skirt and picture hat. And remember that he action in a close-up should logically ollow that of the medium shot preeding it.

Strive for technical perfection.

Use a tripod or some other camera upport, and filter in direct sunlight. Be careful of focus and exposure. Remember that white snow acts as a reflector and doubles the intensity of the ight. And, keeping this thought in nind, strive for close-ups near the snow. You will find that the reflecting quality of the snow throws the light back on o the face, producing excellent effects n even, flat lighting.

This season, with its crisp, sparkling now and black, leafless trees, is one of monochrome's strongholds in a world of color. Polychromatic film cannot quite equal the black and white rendition of the powdery translucence of back-lighted, swirling snow.

However, one of the advantages of color film in snow time should be mentioned. When filming is done on hazy or cloudy light, color stock will give interesting results, while the complete loss of contrast under similar conditions robs monochrome of much of its pictorial quality and renders it far less desirable except for record purposes.

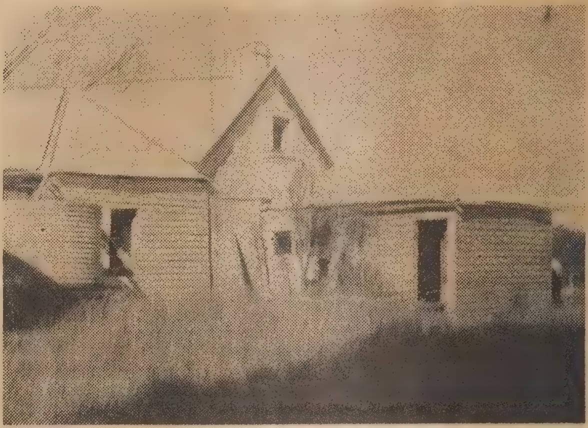
WHEN SUN IS LOW

The sun is low in winter time, and shading the lens against its direct rays presents a problem when you are filming a subject with back lighting. Shooting directly into the sun, it will be impossible to shade the lens properly without using some object in the picture area. Natural shade, such as that of a tree, will sometimes cast a shadow just large enough to ward off the sun's rays from the lens.

Silhouettes will have to be made when the sun is completely hidden behind the object.

Do not hurry over your winter films. If the first opening scene is made in bright sunlight, do not have the second scene filmed under cloudy conditions. The transition is too marked. It is better to wait for another sunny day. If time does not permit this, shoot a few feet of clouds gathering over the sky and splice them in between the two sequences.

WHAT'S WRONG WITH THIS?



Not much can be done to redeem this picture. The eye goes straightway to the black mass of shadow in the foreground. That should not be there. Then, too, the tank is unsightly. The story the picture is trying to tell is one of age and decay. But it is told rather grimly; and it should be told beautifully. With a little care, the right effect could have been obtained by making a close-up somewhere near the small tree right in the middle. It would then be a matter of arranging light and shade so that the finished job would be easy on the eyes. Again here, too, there is too great a contrast between brilliant sunshine and heavy shadow. A slightly better picture could be obtained by dubbing in some clouds. But nothing will ever make it a good picture.

"Make one out of two" —

in fact, out of the two images you see in the rotating wedge distance meter on the SUPER IKONTA 2¼"×3¼". Simply turn the small controlling disc until the two coincide and you have then focussed the correct distance.

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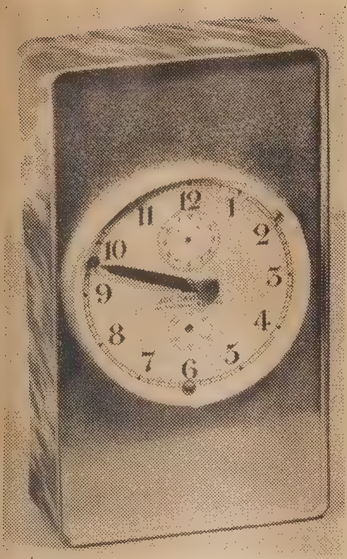
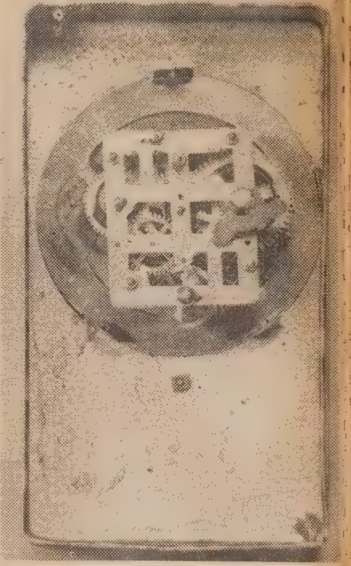


The clock from the front. Any suitable tin may be used as a mount, according to shape and size required.

By
A. J. BARNES

Modern photography often calls for exact timing, particularly where extremely "fast" papers are used. This article describes how to make a simple time clock on which you can check off the seconds quickly and accurately. Materials are few and construction is very easy. It will prove a real boon if you have been doing the job with a small wrist watch.



This picture behind the works illustrates how the second hand is centred on the dial.

A DARK ROOM EXPOSURE CLOCK

ONLY a few years ago Ernst Leitz introduced to a sceptical photographic world the first precision type of miniature camera.

The present popularity of miniature cameras (makes and types legion), its future possibilities, and the fact that "postage stamp" negative material is being used by amateur and professional alike, speaks volumes for Leitz's enterprise.

Work with small negatives calls for a knowledge of projection printing or "enlarging," and prints so made are invariably on fast bromide paper. Unfortunately this material has little latitude—both exposure and development must be dead right. Counting off seconds gives erratic results—something more readable than the tiny second hand of a wrist-watch or clock is desirable. Here is a "seconds" timer which can be made up in an hour or so.

CONSTRUCTION

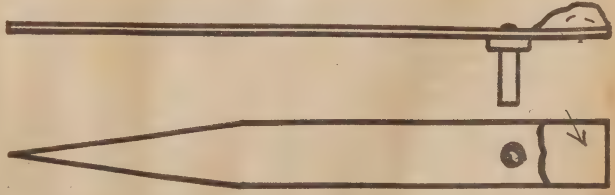
The basis of the whole caboodle is an ordinary cheap alarum clock, any old one will do so long as the second hand mechanism is workable. The case may be a chocolate tin or similar container.

First remove the winding keys and back cover from the clock, screw out the feet and gong, nip off the hammer. The works with hands and dial attached should easily slide out of the case.

Now remove the hands and dial and cut off all projecting spindles other than the second hand spindle. The next move is to punch a clean ¼-inch hole in the bottom centre of the chocolate tin and then mount the clockwork inside, with the second hand spindle projecting through this hole. Use small nuts and bolts to attach the mechanism—never solder, for the corrosive flux will surely "gum up the works."

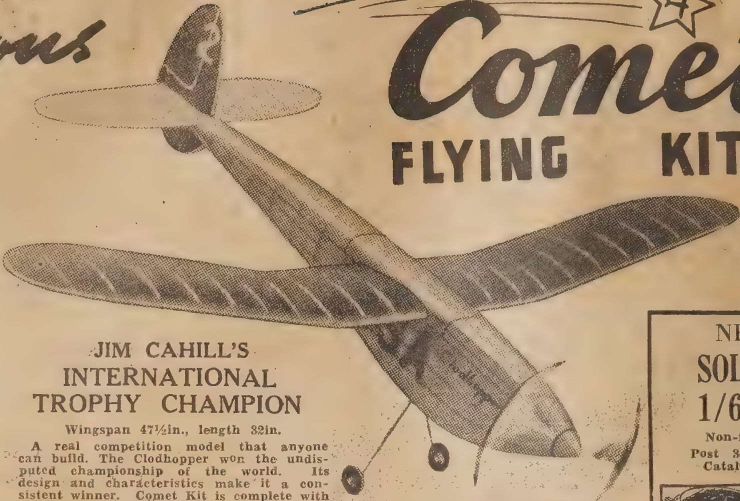
Now we centre the dial over the second hand spindle and glue or bolt in place. You will notice that the second hand is riveted to a small brass sleeve, which in turn pushes on to the spindle. Remove the hand from this sleeve, and in its place fit a large one cut from tin. The best way to do thi is to punch a small hole, fit to sleeve and then drop a small blob of solde into the hole. Our new second hand must now be balanced so that th mechanism can drive it around—to d this we counterweight the slight projection opposite the pointer. Thi counterweight consists of solder ru on and pared off until the hand wil stay in any given position whe rotated upon a sewing needle.

The rest of the business will no be obvious—we fit the large hand t the spindle and crank up. Make sur that the hand does not rub on th dial. Because the second hand no traverses the hour dial, we have, i effect, greatly magnified the second counter—quite a change from "screwing" at watches!



Two sketches of the new "hand." Above shows a side view, with an exaggerated blob of solder as a counterweight. Below is the hand from the top.

Famous Comet FLYING KITS



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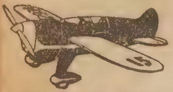
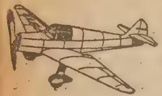
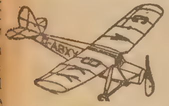


Art Chester Racer.



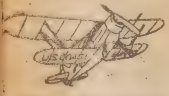
Ryan Cabin.



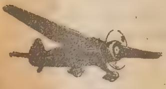
Puss Moth.

25in. SPAN KITS, 2/11

flying scale models.



Waco Coast Guard.



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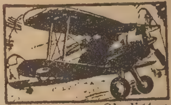
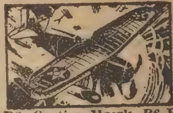


B8 Gloster Gladiator



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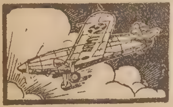

B11 Curtiss Pursuit.

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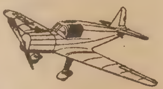

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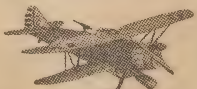

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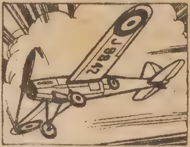

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My latest model—a modified "Quaker Flash," which weighs only 2lbs. 4oz., in flying trim. On its first flight this model put up an exceptional performance, but ended up head on to a telegraph pole. Watch next month's issue for further details.

By
A. G. HULL

WHILST it is not possible for me to run my fingers through a white beard and claim to have had fifty years' experience with model planes, I do not hesitate to offer advice about planes, for in the few months that I have worked on them, I have been able to get results, build planes that have actually flown perfectly, without getting smashed and (proudest moment of all), I have been able to master the little engines, so that they start easily and run faultlessly.

I have noticed only too clearly the surprise that all this has caused to the "old-timers," who have held that a petrol-driven model should only be attempted after years of experience with rubber models.

But it is not my object to boast; all that I want to do is to establish that I know what I'm talking about and then do my utmost to help others to get the same satisfactory results.

THE DESIGN

As regards the actual stability of the model in flight, the way it roars off the ground, heels over in a steep bank and climbs in a spiral for hundreds of feet in less than a minute, to glide for a quarter of an hour after the engine is switched off, and to come to rest as gracefully as a bird, I can't claim any credit or offer any advice except to suggest that you follow my example and work only from the American designs, which are supplied with the popular brand of kits, which have proved successful in all parts of the world. Later I hope to be able to design my own planes and publish details of them on these pages, but for the time being I am happy to follow the designs of Paul Karnov, Carl Goldberg, and other Yankee experts, who have had experience in designing kits for use by the masses.

STARTING

But there is little overseas advice available on how to start the baby petrol motors and look after them, so here a subject where I may be able to hel

IGNITION

It is futile to expect to get satisfactory starting if the only source of powe for the ignition is a run-down torch ba tery. Once started, the engine will ru on a weak spark, but for easy starting fat and hot spark is a great help. Eve half a volt into the primary of the cc will give a spark at the plug points open air, but it isn't the sort of spai that I mean when I say "fat and hot What is needed is an input of about fo volts when on a load of eight or te amperes, which is the normal drain c the battery when the contact-break points are closed. Ten amperes is terribly heavy current to draw fro torch batteries intended to supply on a fraction of an ampere. The torc batteries should be used only for th actual flight. The ideal arrangement f the enthusiastic model maker is to hav a heavy-duty (car type) accumulator the bench for all bench work, runnin in, etc. If in doubt about burning ou the coil with the full battery, use only tw cells (four volts) at a time. In prac tice we have found no difficulty wit the full six volts in the primary of th coil unit supplied with the "Migh idget" kit. If using six volts, be sure have the spark plug in circuit to act s a "safety valve" for the coil.

For starting the engine on the flying eld a booster unit, consisting of three A" type cells, should be used, with heavy eads attached to them and big battery lips. The three cells are connected in eries, and be sure you have them connected properly. We noticed one fellow trouble with starting, who had his ells connected in a short circuit by istake for a series connection!

Here in a nutshell is my suggestion or how to get satisfactory ignition: Use car accumulator on the bench, use a ree-cell booster on the field, and use e torch battery only for the minute actual flying. Switch over to the rch battery only when the engine is unning at medium or fast speed.

SE FRESH FUEL

Keep your petrol and oil in separate ontainers and mix yourself up a bottle f fuel to exact specifications on the ay you are doing the flying. Given hot, fat spark, a clean spark-plug and tank full of proper fuel, starting is ure to be easy.

Before fitting the plug take a good ook at the spark and make sure it fires very time the contact breaker opens.

Disconnect the battery, fit the spark lug tightly and spin the prop six times ith the jet wide open, and the finger ver the end of the induction pipe.

Then connect the battery, swing the rop and stand clear. I'm sure that you'll find that you have overcome the one problem that seems to worry builders of petrol-driven model planes—difficult starting.

These remarks apply especially to the Bunch "Mighty Midget" engine, but I feel sure that they are also applicable to the majority of small two-strokes.

Incidentally, in the July issue I mentioned that the "Mighty Midget" motor had an aluminium cylinder fitted with a steel sleeve. This was an error.

DONT'S

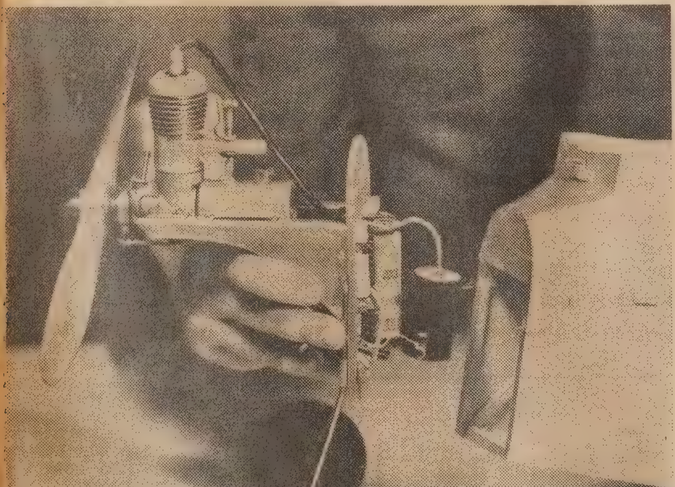
Don't put current into the coil unless the plug is connected, with the base of the plug contacting the cylinder, so that the spark can jump at the points. If it doesn't, it may jump through the insulation of the coil and ruin it.

Don't try to tighten the spark plug with pliers. Make or buy a socket wrench of the right size and tighten the plug firmly on to an evenly placed copper and asbestos washer to make sure there is no air leak.

Don't let the motor stand on the bench for weeks at a time with a tank full of fuel. Drain it after every day's flying.

Don't leave the ignition batteries connected with the contact breaker closed and the motor standing idle. You'll flatten the heaviest batteries in minutes if you do.

Don't fit the propeller anyhow. Make sure that the contact breaker opens right in the middle of the "swing."



This close-up shows the engine mounting and landing gear, where the design of the original "Quacker Flash" has been modified to make it lighter and yet crash-proof. The plywood "firewall," which carries all the ignition gear, is held in place with spring clips and becomes detached in the event of an accident.

CLUB NEWS

The July meeting of the model Aeronautical Association was held at Maroubra Labor Farm under ideal conditions.

THE wind was reasonably strong, but otherwise the weather was perfect. Naturally, the combination, good conditions and good models, resulted in splendid flights. Cliff Hart, of Chester Hill, carried off the Duration Trophy with a flight of 10min. 59 2-5sec.

Malcolm MacGregor, of the Aerobats, ran into second place with 6min. 11 4-5 sec. Eric Cocks, also of the Aerobats, ran third with 5min. 52 4-5sec. Eric has proved himself a most consistent flier lately; he usually manages to run into a place, no matter what the contest.

AEROBATS AGAIN

In the third round of the Inter-club Shield, the Aerobats again carried off the honors. This makes the third successive win to the Aerobats. So far, three contests have been flown, and the "Bats" have won all three. The Bats' aggregate was 10min. 14 1-5sec.

Previously we have mentioned the fact that, though they went close to winning the Shield last year, until this contest they had not been in the running. However, we were pleased to see Parramatta demonstrate a return to form by running second in this contest. Their aggregate was 7min. 53 2-5sec. Third place went to Leichhardt.

MORE TECHNICAL TERMS

LIFT

The vertical component of the force generated by the wing of an aeroplane. Or, more clearly, the upward thrust caused by the movement of the wing through the air.

CENTRE OF PRESSURE

Sometimes called the centre of lift. The point through which the lift acts. On most wings this point is situated at one-third of the chord back from the leading edge. Unfortunately, this point is not stationary, but, on most wing sections, moves forward as the angle of attack increases, thereby causing stability trouble.

DRAG

The component paralleled to the relative wind of the total air force on an aeroplane or wing. In other words, the resistance of the machine to movement through the air. Drag can be divided in two—Induced Drag and Parasitic Resistance.

NEW COMMITTEE FOR M.A.A.

At a special meeting of the M.A.A., held at the Y.M.C.A. on Monday night, August 14, a new committee and set of office bearers was elected.

THE meeting was a most enthusiastic one, and the new committee is anxious to pursue a vigorous developmental policy over their term of office.

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NATIONAL CHAMPIONSHIPS

In the near future the M.A.A. will be conducting the Australian National Championships, and already it is apparent that a valuable range of trophies will be available, and competition should be very keen.

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NOT SO EXPENSIVE

Flying models driven with petrol motors is not as expensive as some people imagine.

A good motor can be obtained for under £6, and will last for years, especially if used with a timer so that it runs for only twenty seconds for each flight. Even the keenest modeller will find that he has his hands full if he builds and flies four new models each year.

At a rough guess, we'd expect the motor to outlast his first dozen models, meaning that the price of the motor can be spread over these, averaging about ten shillings per model.

With care other material costs would work out about £1 each. In other words, you can be a most active modeller of petrol-driven planes for about half-a-crown a week.

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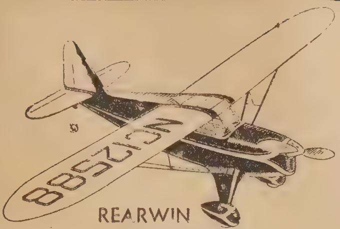
RULES FOR CONTEST FLYING

In the near future it is likely that the rules governing petrol-driven models will be revised, some of the newcomers to the game being keen to try the American rules.

They claim that the timer method allows a more careful adjustment of the motor before the model is released, allows the use of adequate oil in the fuel, and encourages the building of cheaper, smaller and handier models capable of more spectacular performance.

Of course, there are always two sides to every argument, and it is hoped that all interested in model flying will make a point of expressing their views about these rules before the conditions are drawn up for the running of the Nationals.



REARWIN SPEEDSTER

Also in the same range.

TAYLOR CUB,
FAIRCHILD RANGER,
AERONCA K.

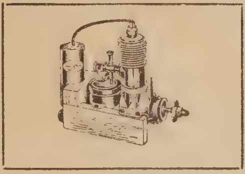
Easy To Build
Easy To Fly!

Megow 50" Giants

Build this Rearwin Speedster. You'll find it easy and you'll have lots of fun. These beautiful models keep to authentic scale design and still give excellent flights and the kit simplifies the building.

Also in the same range:— Taylor Cub, Fairchild Ranger, Aeronca K.

Any of these four fine flyers for only 12/-. (Postage 1/-, Interstate 1/6).



Here's Power!

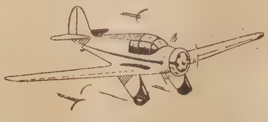
The famous Brown Junior Motors are still the greatest contest winners in Model Aviation. Consistent performance, first quality, and rugged construction, are features of these motors.

The model B has a special chrome Molybdenum crankshaft, which makes it practically shock proof. Model C offers all the advantages of a Brown Junior at a medium price. Of sound, sturdy construction, it combines light weight with speed and durability.

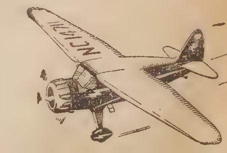
Prices: Model B, £9/12/6.
Model C, £7/12/6.

This Book tells you

All you want to know about Model Aeroplanes. It has over 700 plans of record machines—Gas, Outdoor, and Indoor models—and page after page of design, construction, and model aerodynamics. This book, the 1937 edition of a Model Aeronautics Year Book, by Frank Zaic, is excellent value at 4/6. But—and here's news—if you write or call and mention this advertisement you will be given a copy for the price of 3/-. Don't waste a minute. Write or call for your copy immediately—the supply is limited.



AERONCA



MONOCOUPE

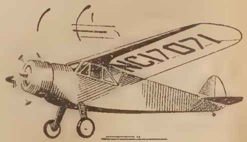
Build These 24in. Flyers

This "Peerless" range is particularly sound value at 3/3. Everything you need to build a model is contained in the kit, the instructions are clear and simple, the materials are of high quality, and the job of building becomes remarkably simple.

The range also includes Cessna, Taylor Cub, Kinner, Ryan S.T., and The Fleet Trainer.

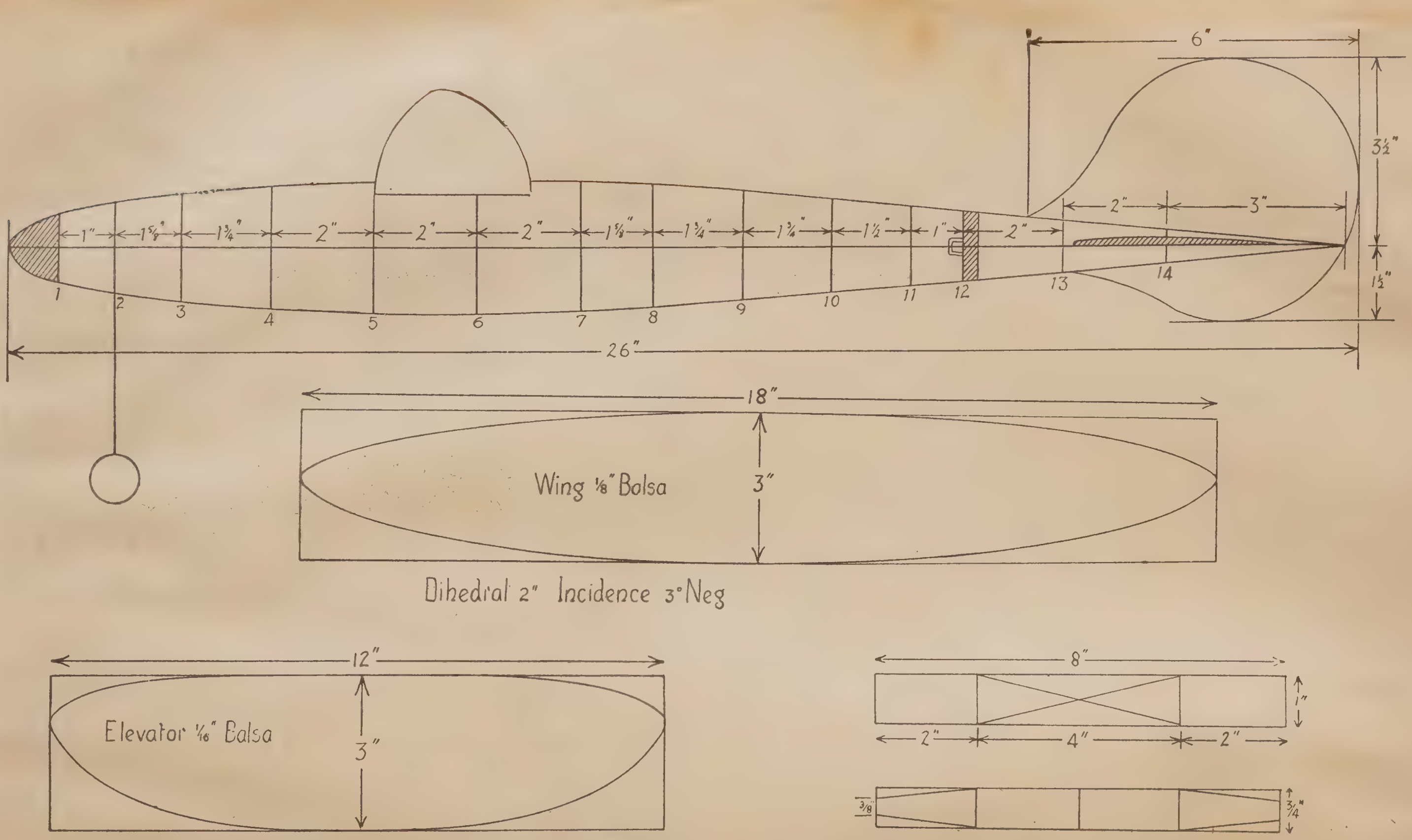
Start model building with one of these simple, inexpensive flyers.

Splendid Value at 3/3
(Postage 4d.)



STINSON TAPER WING

K-DEE PTY. LTD.
56a GEORGE ST.
SYDNEY


6"
3½"
1½"
2"
3"
1"
1⅝"
1¾"
2"
2"
2"
1⅝"
1¾"
1¾"
1½"
1"
2"
1
2
3
4
5
6
7
8
9
10
11
12
13
14
26"
18"
Wing ⅛" Balsa
3"
Dihedral 2" Incidence 3° Neg
12"
Elevator 1/16" Balsa
3"
8"
1"
2"
4"
2"
3/8"
¾"

Here are the full plans for building the speed model. These should be drawn out full size before commencing the model. This will enable you to make direct measurement checks when required. Overleaf will be found full sized drawings in outline of the formers on which the fuselage is built. Each is numbered to check back with this diagram. The dimensions of the propeller are given bottom right.

FIFTY-FIVE MILES AN HOUR!

from a speed model

Building model planes for speed alone is a fascinating branch of the game. It is possible to obtain speeds of more than 60 m.p.h. from a properly-made plane. Here are the plans of a plane which has put up some excellent figures. It also illustrates an "all-balsa" method of construction which might be applied to other types of planes.

THIS model was designed for speed, and so far it has succeeded in travelling a 50 yards course at an average speed of 55 m.p.h.

Speed in a model depends largely on controlling power. With a reasonably high pitch propeller and plenty of rubber, the problem becomes one of keeping the model on an even keel. For stability a high wing was chosen, and by experiment it was found that an abnormally large fin was required to overcome torque and keep the model on a straight course.

Another difficulty was experienced in stopping the model from climbing, even though the wing section is only 1-8in. thick, it still generates sufficient lift to send the model zooming vertically unless it is set at 3 degrees negative incidence.

In common with every other speed model, this particular job should be flown on a calm day for best results.

STREAMLINING

Streamlining is, of course, the keynote of speed design, and strength is just as necessary if the model is to have any life at all. Therefore, all balsa construction was chosen, even to use of a sheet balsa wing and tail group.

The single-strut under-carriage of light 22 gauge wire was designed to offer very little resistance on landing. It protects the fuselage and propeller under normal landing conditions, but a full-powered landing folds it back completed. Because of its lightness, it can take any shock without causing undue strain where it is fixed to the fuselage. Had wire, sufficiently strong to stand up under fast landings, been chosen, the first bad landing would probably have carried away the former to which it was attached.

The average model-builder need have no fears about attempting this model, but the beginner should place two or three really fine fliers to their credit before attempting speed flying.

Check over the plans carefully before attempting construction, and make sure everything is quite clear. Actually, there is nothing complicated about the construction, but it is always wise to have a clear impression of the finished model before cutting the balsa.

WING AND TAIL

The wing and tail are quite simple, merely being cut from sheet balsa to the shape and size shown on the plan. The wing is cut from 1-8 medium grade balsa, reasonably light and strong. The tail is cut from the balsa, which should be chosen very carefully. It should be light and pliable, and yet strong enough to stand up to fairly severe shocks. Lightness is very important, since the weight of the tail can influence the position of the centre of gravity and necessitate the wing being set too far back from the nose for stability.

The wing and tail are both sanded to streamline section. The tail is left till the fuselage framework is completed, but the wing should now be completed.

CAREFUL SANDING

The wing, of course, is made in one piece. The dihedral angle is formed by partially cutting through the centre and then cracking across the wood. The two halves are not actually separated, but the joint is liberally smeared with cement, and the joint is thereby strengthened. An extra piece of balsa should be cemented across the dihedra joint to strengthen it.

Now we are ready to start on the fuselage. This is built up with a framework of stringers and formers, and then covered with many planks of ¼-inch wide and 1-10in. thick.

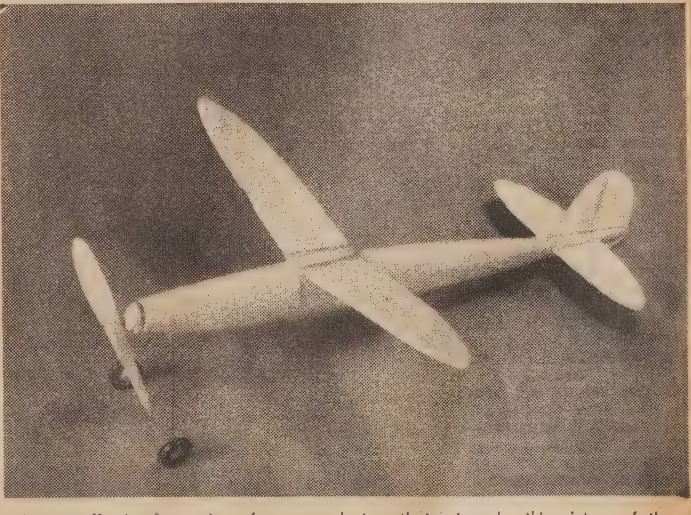
First, cut the formers to the shape shown from 1-10 balsa, and then take the two main side stringers, cut from 1-16 square balsa, and mark on them the position of the formers.

The formers should be cut from fairly hard balsa. The grain should be scallopy in appearance and the wood fairly rigid. It should not be pliable, but neither should it be brittle. The stringers are made from stringy 1-16 balsa, fairly light but pliable and reasonably strong.

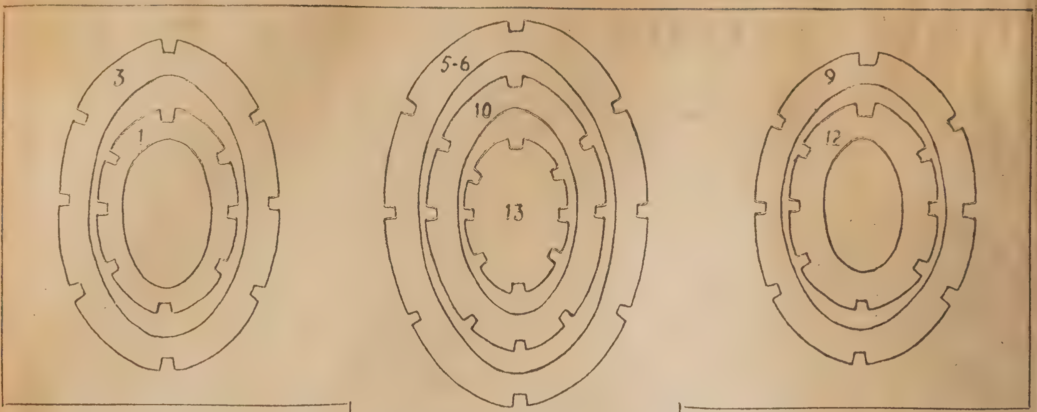
The nose former should be laminated from three sheets of 1-16 balsa.

See that former No. 11 is left solid and strengthened to take the tail hook.

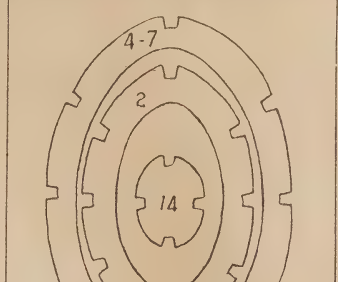
The stringers are placed into position in rotation, working first on one side and then on the other, so as to avoid warps. Particularly in speed flying are warps fatal.



A very effective impression of grace and strength is given by this picture of the speed model.



These diagrams show the actual sizes of the formers on which the fuselage is built. You can trace the outlines direct from here.



When the framework is completed, cement the undercarriage into position, and it is ready for covering.

Select very soft 1-16 sheet balsa for covering, make sure it has a stringer grain and see that it is clear and unblemished. Stains and watermarks on balsa do not weaken it overmuch, but it will spoil the appearance of the covering job.

To facilitate cementing the planks into position the cement should be placed in a tube. An empty toothpaste tube, properly cleaned, can be filled with cement, and the cement squeezed onto the joints. This simplifies construction and saves cement.

Cut the planks ¼in. wide and the full length of the sheet. Run cement along the main side formers and then cement a plank into position on each side.

BOTH SIDES TOGETHER

It is essential that both sides be covered at the same time, again to avoid warps.

After two or three planks have been applied on each side, planks should be applied on the top and bottom of the framework. As the work progresses it will be found necessary to cut the planks in order to have them fit. Joints should be as neat as possible, but always remember that the sheet balsa covering is to be sanded down to an overall thickness of 1-32 inch, and in the sanding process unevenness will be removed.

Cement should be applied between every joint. Where the planks butt and wherever they touch the framework they should be cemented thoroughly. The strength of this model lies in the covering, it is therefore essential that each plank be thoroughly cemented to its neighbor.

The covering is continued right to the tail on the bottom, but on the top the last 5 inches are left uncovered.

The top stringers are cut away and the top half of the last former is cut away. Across the two side stringers the stabiliser is securely cemented and then the fin. Supporting pieces of 1-8 square balsa are cemented along each side of the joint between the stabiliser and fin. The covering is then completed by cementing planks either side of the fin, conforming to the general streamline shape. The under part of the fin is cemented in place after the covering and a strip of 1-32 x 1-16 bamboo is cemented around its outline to save it from being knocked off.

The fin will have to be constructed in two pieces, because it is 5 inches wide, and sheet balsa is only 3 inches wide. It is, of course, essential that the grain of the wood should run vertically.

That completes the covering job and the stabiliser. The top of the fuselage should now be cut to take the wing.

The covering is cut away about ¼ deep. The wing position is shown on the plan, and it begins at the fifth former. The sixth former should be cut away, and both formers strengthened with a cross piece of 1-16 x 3-16 balsa.

The covering from the 5th to the 7th former is cut away about ¼in. deep. The sixth former is cut away at the top, and the formers 5, 6, and 7 should each be strengthened with a cross piece of 1-16 x 3-16 balsa.

A piece of sheet balsa is cut and fitted to position so as to form a flat surface for the wing. A piece of 1-8 square is then cemented each side of this platform to accommodate the dihedral.

The wing when attached should fit flush with the top of the fuselage and should be held firmly into position by rubber bands passing around the fuselage and over the wing. Do not use hooks to attach the wing to the fuselage, they have a bad habit of pulling out. Pass the rubber bands right over the wing and it will be safe.

THE PROPELLER

Now all we have left is to make the prop and noseblock, power the machine, and fly it.

The plan shows the dimensions of the propeller. It is carved in the usual manner, but the hub is left its full thickness and not cut away after the blades have been carved, as with a duration prop.

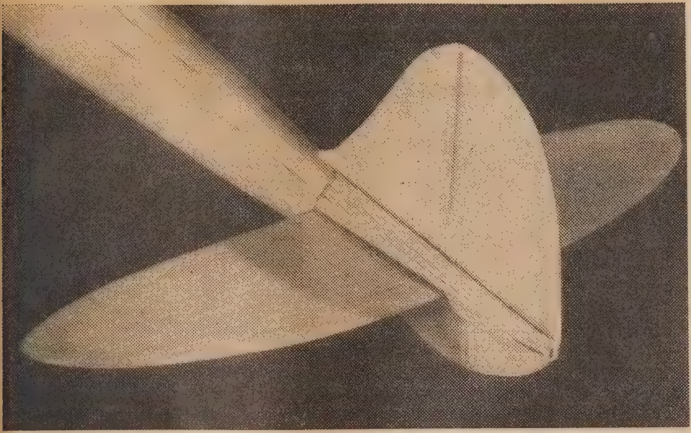
The wood for the propeller should be hard and strong. Balsa is quite satisfactory, but it must be strong. Weight is not particularly important on the propeller.

The noseblock is laminated and the bushing of brass tubing.

Flying the model is not difficult. About 3 degrees negative incidence is required on the wings as well as down thrust and side thrust on the propeller. That is

(Continued on Next Page)

TAIL ASSEMBLY OF SPEED MODEL



Special care should be taken to see that the tail assembly is firmly put together.

—the propeller shaft is offset downward, and to the right.

The proper combination of incidence and thrust alignment will be found by experiment. Test fly your model on half winds and over bushy country to lessen the damage on crashes. Treat the model gently and experiment cautiously and you'll soon be churning out the m.p.h.

The power needed is optional. It depends on the speed required. Flying on 6 strands of ¼ flat M.L.L., the model turned out 40 m.p.h. over 100 yards. On 20 strands of 1-8 flat it recorded 5 m.p.h. over 50 yards. The more power so the speed increases, but the flight length decreases. Proceed cautiously at first and work up to super speed.

Make sure everything is truly aligned and solidly fixed. The tail should be solidly cemented, and the wing needs plenty of rubber to hold it in place. Avoid warps and don't try to control the model by washing out the wing or elevator. You'll probably wash out the whole machine if you do. Control comes from incidence and thrust angle.

The model has been so designed that only the thrust and wing incidence need adjusting. Build the model reasonably light, adjust it carefully, slap on the turns, and then watch the m.p.h.

Incidentally you'll need to muscle up the throwing arm, this speed job needs a decent heave to give it flying speed, and it gets away very fast.

MORE TECHNICAL TERMS SIMPLY EXPLAINED

INDUCED DRAG

Drag induced by the lift of the wing, and therefore cannot be avoided.

PARASITIC RESISTANCE

Drag which, though not entirely avoided, makes no contribution to the lift or thrust of the machine. Streamlining reduces parasitic resistance, as does polishing the surfaces to reduce skin friction.

DIRECTIONAL CENTRE

Actually the centre of laterally projected area. Called the directional centre because the model is said to turn about this point.

AEROFOIL

A surface designed to generate lift when projected through the air.

ASPECT RATIO

The ratio between the span and chord of a wing or tail.

EMPENNAGE

The same as tail.

MONOCOQUE FUSELAGE

A type of fuselage construction in which the outer shell is designed to absorb the stresses to which the fuselage will be subjected, with a consequent minimising of internal structure.

CENTRE OF GRAVITY

The point through which the weight of the machine acts vertically downward. On a model the wing should be attached so that the centre of pressure comes above the C. of G. The C. of G. is sometimes called the balancing point since it is the point at which the machine balances.

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Here is John Cavill sending up a small glider. This fine action picture illustrates the power and swing required to get the longest glide. It takes quite an amount of practice to make the most of your glider, and it is only half the battle to build one which is capable of good performance. Correct launching is an art which must be learnt.

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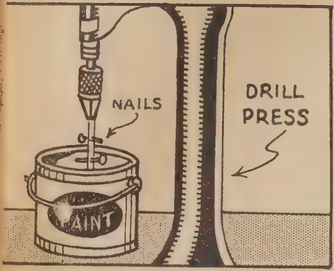
Hints For Your Home Workshop

EASY WAYS OF DOING THINGS



LABOR-SAVING PAINT MIXER

IF you have tried to mix a gallon of paint after it has been standing for twelve months or so you will know how much effort goes into the mixing process before it is ready for use.

With the help of a drill press the job can be done in a few minutes. Simply hammer a few nails through a piece of wooden dowel as shown in the sketch, lock in the chuck of the drill press, lower into the can of paint and switch on the juice. In about a quarter of an hour the paint will be ready for use.

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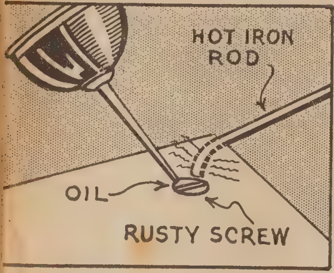

REMOVING RUSTY SCREWS

IT is often quite a task to remove rusty stubborn screws without the danger of twisting the head off. A simple way to overcome this difficulty is to pour a small quantity of oil over the screw and to heat the screw with a hot iron rod as shown in the illustration. After the screw has become heated it is a simple matter to remove it.

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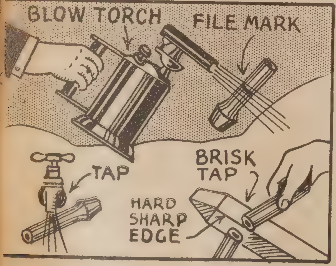
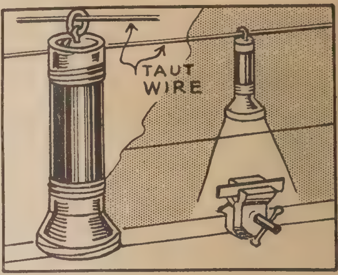


CUTTING PORCELAIN TUBES

THE radio fan and electrician is often faced with the problem of cutting off porcelain tubes to a correct length without leaving jagged edges. First mark the tube with a three-cornered file where it is to be cut. Heat the point marked in the flame of a blow torch, being sure to revolve the tube while the flame is being applied. When the tube is quite hot place it under a tap allowing the cold water to play on the part marked by the file. Now give a brisk tap on some hard sharp edge and the job is done.



A QUICKLY CONSTRUCTED BENCHLIGHT

IF you are in a jam to get good light on a project and cannot afford the time to cut flex, mount adaptors, &c., the following hint will be found effective and quick. Stretch a piece of stout cord or wire over the bench, first of all threading it through the carrying handle of a torch, as shown in sketch. The torch can be slid along the wire till the light covers the desired spot on the bench.

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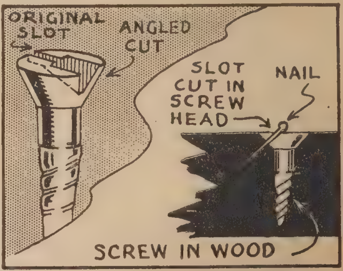


MAKING A SCREW A FIXTURE

A NAIL driven into an ordinary screw effectively thwarts any attempt to remove it from exposed hasps and hinges. A cut is made at an angle in the screw head with a thick hacksaw blade. The hinges are then mounted, using the prepared screws. After the screws have been securely inserted, small finishing nails are driven into the enlarged slots at an angle, so as to hold the screws rigid. A punch will aid in driving the nails below the level of the screw heads.

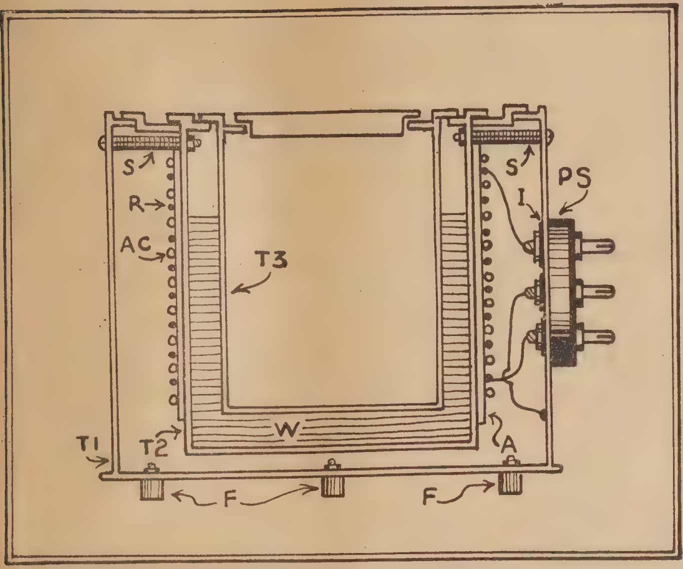
ADJUSTABLE GUIDE STOCK

Genuine O.K. Greenfield Adjustable Guide Stock, holds adjustable round split dies 13-16in. outside diameter. The adjustable guide, which insures the cutting of straight threads, can be seen in the rear view. Sturdily built—well balanced—with small screwdriver for changing dies.
PRICE EACH 6/6
BUTTON DIES—to suit above stock. Whitworth Thread, 1-16in., 5-64in., 3-32in.
EACH 1/10
1-8, 5-32, 3-16, 7-32, 1-4, 5-16, 3-8in. EACH 1/6
S.A.E., B.S.F. Brass and B.A. sizes also available.

NOCK & KIRBY LTD.
417-421, also 188-194A GEORGE STREET, SYDNEY.

Building AN ELECTRIC GLUE-POT

By
W. G. NICHOLS



A cross-sectional diagram of the glue-pot which should be studied when reading through the article.

Here is an article describing a very easily-made addition to your workshop equipment. Full details are given for its construction.

A NECESSITY in every workshop, particularly where woodworking is done, is the glue pot, and to be really modern, efficient, economical and convenient it must be electrically operated. The enthusiast who builds this little unit will be amply repaid for any time and care put into its construction.

THE MATERIALS

The materials required are easy to obtain and quite inexpensive and are, three tins with recessed lids (use tins with lapped joints not soldered) the dimensions of the tins are given later in the article, a 6in. x 15in. strip of thin asbestos sheet, three yards of 1-8in. asbestos cord, 12in. of asbestos sleeving, a 250 watt spiral heating element and three plugs and sockets (as used on electric irons) for making the plug and socket connector.

First take the largest tin "T1" in sectional diagram, which should measure approximately 5¾in. in diameter by 5in. high; on the bottom of this tin scribe a circle 1in. less in diameter than the bottom of the tin. At three equidistant points on this line drill 1-8in. holes to accommodate the fixing bolts which fasten the three short legs "F" in sketch to the tin. These legs can be either ¼in. rod cut and drilled to receive nuts and bolts or can be small bolts with ¼in. hexagonal heads, the heads acting as the legs of the glue pot.

On the side of this tin mount the power socket, this should be constructed of a bakelite plate with the three plugs mounted on it, this should then be screwed to a piece of hard wood shaped to the contour of the tin; details of the power socket are clearly shown at "A" in fig. 2. When mounting on the tin be sure that the two outside plugs DO NOT MAKE CONTACT WITH THE TIN

We may as well deal with the second section of the power socket "B" in fig. 2. This is made of two bakelite plate and a piece of hardwood, th three sockets are mounted on one piec of bakelite, making sure they are cor rectly spaced so that the three plug will fit into them, the second piece o bakelite has merely three holes slightl larger in diameter than the plugs.

When fitting the bakelite plates t the hardwood first place the one with the sockets mounted on it nearest t the wood and then the other piece, thu preventing any possibility of the hand making contact with the sockets shoul the power be left on.

A three-wire cable is then connected t the sockets and taken to the AC supply

THE SECOND TIN

Now take the second tin, "T2," th should measure 3¾in. in diameter an 4¾in. in height. At four equidistan points around the circumference, an about ¼in. down from the top drill 1-8i holes. Now lower this tin inside th larger tin "T1" until the tops of th two tins are level, and mark the centre of four 1-8in. holes in the larger ti to correspond with the four holes yo have drilled at the top of the smalle tin. Drill the four 1-8in. holes, th centres of which you have just locate and assemble the two tins with bolts an spacing washers as shown at "S" in th diagram.

Now remove the smaller tin "T2" an cut a strip of thin asbestos sheet t such a size that it will wrap aroun the tin covering to within ½in. of th top and bottom. The asbestos can b anchored to the tin by binding a spa piece of resistance wire around the to and another around the bottom. Thes two pieces of wire will also be used t anchor each end of the spiral resistanc element.

THE ELEMENT

Next take the element itself. Thi will be comparatively short when pu chased, but should be evenly stretche till it is of sufficient length to win over the asbestos, leaving about ¼i space between each turn of the el ment. Wind the asbestos cord betwee the turns of the element, thus preventin any possibility of consecutive turns

AN ELECTRIC GLUE-POT

(Continued from Previous Page)

ie resistance element short circuiting nd thus burning the element out. The inding of this unit is made quite sinple studying the diagram where "T2" is ie tin, "A" the asbestos sheet, the black ots "R" the resistance element, and AC" the asbestos cord. Both ends of e resistance element and the asbestos rd are anchored to alternate ends of ie wires, holding the asbestos sheet place. When fixing the resistance ement allow about 6in. of spare resistace wire at each end of the resistance leads to the two outside pins of the wer socket. Re-insert the tin "T2" tin "T1." Connect the two ends of e resistance to their respective pins the power socket after slipping a ngth of asbestos sleeving over each ad, making sure of perfect insulaon, and connect the centre pin of the wer socket to the tin "T1," thus earthg the tin. Replace the 1-8in. bolts d spacing washers, adjusting the tenon of each bolt till "T2" is dead centred "T1."

HE THIRD TIN

The third tin "T3" measures about 1-8in. in diameter and 4½in. high, and quires no preparation.

The next matter that requires attenon is the lids of the tins. Take the of "T1," the largest tin, and cut circular hole in it that will make a at fit for the top of the tin "T2." ace the prepared lid on "T1" and mmer home. A hole is then cut in the "T2" to receive the tin "T3," the of "T3" requires no preparation.

The glue is placed in "T3" and the ter in "T2" as indicated by the lines "W" in the diagram; don't forget only about half fill this tin with ter as otherwise when "T3" is reaced the water will overflow, due to splacement.

Tins of different dimensions can, of urse, be used as long as the general structions are carefully followed, making sure that water will surround "T3" d heat can completely circulate around 2."

Under actual test it was found to ke nine minutes to have the glue in rking order and if the lid of "T3" was placed after each application of glue was not necessary to again switch the current for at least two and a half urs. The operation cost of this ie pot is exceptionally low, being proximately 1-20th of a penny for o and a half hours' use.

Finally, a coat of black heat-resisting int applied to all outside surfaces will ve you a quite professional looking ectric glue pot.

HOW TO PUNCH HOLES

Right And Wrong Way

A short article which tells you the right and wrong way to use a punch.

In commercial practice sheet metal is punched rather than drilled. Of course, for such work expensive male and female dies of high quality steel are used.

The amateur craftsman can, however, apply the punching method with advantage to many kinds of sheet metal work. In such cases the male die consists of an ordinary pin punch and the "press" good old "Armstrong's Patent"—a hammer! A block of wood is used as the female section of the die.

Punches for such work may be made up from old round files with the aid of a small grinding wheel. There are, however, several important points to observe. The shank or working section of the punch should be parallel, with the end square and flat and the upper end of the shaft should be softened by heating to a blue color.

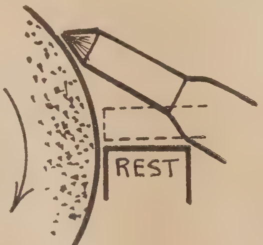


Fig. 1.—
Grinding centre punches. Hold point against front face of wheel and rotate slowly. The dotted lines show the position of a pin punch when grinding.

This latter operation should be carried out for safety's sake—flying chips of brittle cast steel are dangerous! Short shanks are advisable, too, in order to minimise springiness and bending.

The sheet metal should be flat on the end grain of a block of wood (see Figs. 2 and 3), and one heavy hammer blow on the punch cuts cleaner than several light taps.

Fig. 1 is self-explanatory. Note, however, the correct position of the tool rest in relation to the grinding wheel. It is as close as possible to the wheel without actually touching; the top of the rest is horizontally in line with the centre of the wheel.

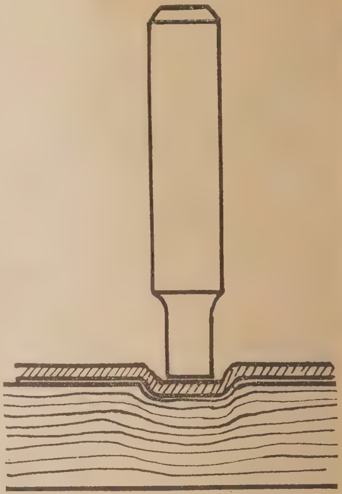


Fig. 2.—
Punching holes—the wrong method. Metal is resting on side of wood block thus springy fibres prevent a clean shear.

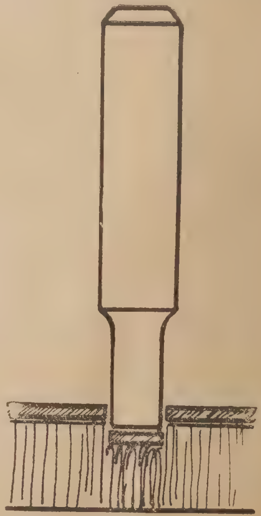
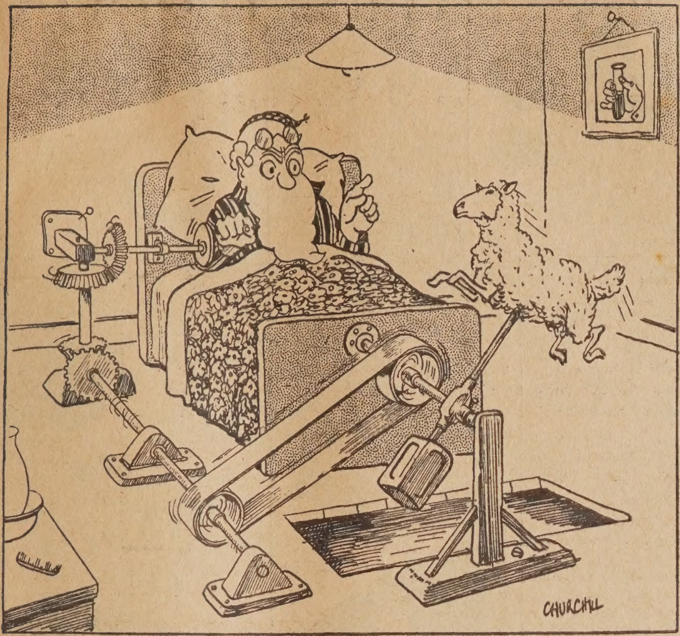


Fig. 3.—
Punching holes—the right method. Metal is resting on end grain, thus fibres are crushed down and a clean "wad" is removed.



The Professor suffers from insomnia.—"Practical Mechanics."

SHORT WAVE STATIONS

(Continued from Page 57)

TAP.—9465k.c., 31.7m., Ankara, Turkey. Heard very well till they close down at 8.0 a.m. (Keast, Lee, Ford, Foster.)

TAQ.—15,195k.c., 19.74m., same location. Have heard this one again at fair level till closing at 10.0 p.m.

Radio Eireann.—9595k.c., 31.27m., Moydrum, Eire. Still being heard at varying strength on opening at 7.30 a.m.

OZF.—9520k.c., 31.51m., Skamlebaek, Denmark. Can still be heard on closing at 2.0 p.m. (Keast.)

PCJ.—9590k.c., 31.28m., Huizen, Holland. This Dutch station heard by Mr. Emery at R8.

HBJ.—14,535k.c., 20.64m., Geneva, Switzerland. This League of Nations station was also heard very well by Mr. Emery.

CSW6.—11,040k.c., 27.17m., Lisbon, Portugal. Mr. Lee heard this Portuguese station at R4 in the early morning. (Foster.)

LYR.—9280k.c., 32.33m., Kaunas, Lithuania. Again heard in the mornings at fair strength until closing at 6.0.

ORK.—10.330k.c., 29.04m., Ruysselede, Belgium. The Belgian station comes in fairly well in the early morning. (Foster.)

HBO.—11,402k.c., 26.32m., Geneva, Switzerland. Heard well between 3.45 p.m. and 5.15 p.m. on operating days. (Foster, Ford.)

HBL.—14,535k.c., 20.64m., same location. This one heard at same time as HBO. (Foster, Ford.)

SP48.—6140k.c., 48.86m., Warsaw, Poland. In the early morning puts in a nice signal both in Queensland and N.S.W. (Gaden.)

CSW4.—15,120k.c., 19.84m., Lisbon, Portugal. Mr. Keast heard this Portuguese one night at 11.30.

STARTLING ARITHMETICAL PROBLEM

ARE you good at multiplication? Try this by mental arithmetic and note the answer. Multiply 5,363,222,357 by 2,071,723. The result will amaze you; it will be seventeen times the repetition of the figure ONE, as follows—

11,111,111,111,111,111.

ELECTRIC CYCLES

AN Amsterdam firm states that it has at last designed an electric cycle, for which it has taken out a patent. It consists of a small motor which is fed by a 12-volt battery, charged in such a way that it would enable a distance of 80 kilometres to be covered. The speed of the machine is not stated. The equipment weighs 60lb., but the sponsors state that this should not prove a drawback. There are over three million cyclists to be seen on Dutch roads, and the inventor hopes that within a few years they will forego their pedals for the electric cycle.

A MICROPHONE FO
TWO SHILLINGS

(Continued from Page 44)

It, therefore, can be orientated wi relation to the loud-speakers to elir inate feedback.

In comparing this microphone wi the magnetic velocity and the co denser it will be seen that it resembl both and, furthermore, has the adva tages of both those microphones as f as frequency response is concerned, b has none of their disadvantages and h also a much higher output.

QUALITY AND OUTPUT

It might also be mentioned that t quality and output of the micropho can be varied by the value of the inp and coupling components. R1 can varied from five to 10 megohms, R2 al from five to 10 megohms, R3 from o to five megohms, C1 from .005 to .02 mf C2 from .1 to .5 mfd., and C6 depende on the desired base response to pa on to the speech amplifier.

The values shown on the circuit di gram have been found here to pro a good averagge value for the averag "ham" or P.A. use.

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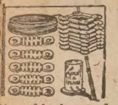
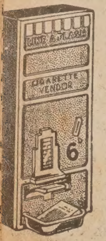
"EVER READY"
BATTERY OPERATEI
1.4 volt Portable 4-valve
£12/10/-
COMPLETE.
Size of portable leatherette covered case, 12in. x 13in. x 7in. Ready for use either in the car or at picnics, etc.
Tiny Tim Kit Set
£5/2/6
Morse key practice set, 9/6, with battery, key and buzzer.
Professional type with high tone buzzer and special Delux key, 21/6.
Call or write for price list of any of the sets in this or previous issues of "Radio & Hobbies." Parts can be sent C.O.D. post or rail.
Radio House Pty. Ltd
296-300 PITT STREET.

Continental — Novelty Cartridge Pocket Knife. A real knife, not a toy. 3/6. Gilt or Chromed.

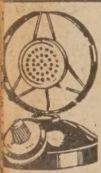


Like - a - Flash "Eliminoise" Aerial Kit for short or dual-wave sets. Aerial, Pyrex type Insulators, transposition blocks and 200ft. aerial coil, 22/6. Eliminates unwanted aerial and hideous electrical noises from your dual-wave or short-wave set.



Like-a-Flash Cigarette Selling Machines, for wall or counter, All Metal, Fool Proof. Two sizes, holds 15 packets of 6d cigarettes. Price, 32/6. Larger size, holds 24 packets of 6d cigarettes. Price, 37/6.

Match Machines also available, holds 24 packets, 37/6. Lots of 50, 33/8. Lots of 100, 30/5.



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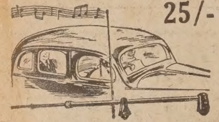

25/-

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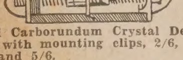
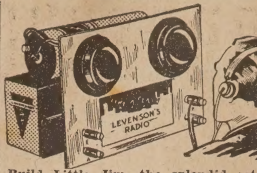


Fixed Carborundum Crystal Detectors, with mounting clips, 2/6, 3/6, 4/6, and 5/6.

ACCUMULATORS! Fully Guaranteed. Write for Surprise Values. "Ashby" Ball Bearing All Metal Extension Skates, 18/6, 22/6.



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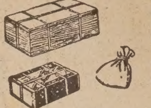

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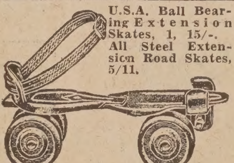
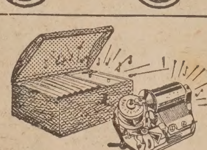
20/- WORTH OF SPLENDID TRICKS AND PUZZLES.

Presto, the Box Trick, the Belt and Nut Puzzle, Jafet's Mystery Wallet, The Donkey Trick, Off with Her Head, The Hindu Mystery, The Teasing Trick, The Squarem Puzzle, The Shy Lock Trick, The Palpitating Plate Lifter, The Obedient Ball, The Cricket Bat Trick, The Vibrating Match Box, The Hindu Paper Trick, Tell Anyone's Age by Cards, Rubber Nuts. Write for full list of Tricks, Puzzles, and Games.



U.S.A. Ball Bearing Extension Skates, 1, 15/-. All Steel Extension Road Skates, 5/11.



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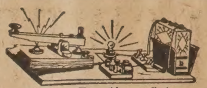

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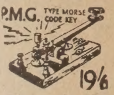
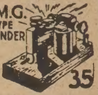
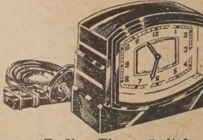

P.M.G. TYPE MORSE CODE KEY
19/6



Remington U.S.A. made Hunting and Sports Knife, in Leather Sheath, 10/-.

Throwing Knives, made in Sheffield, 6/9. As illustrated.



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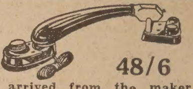

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Just arrived from the maker in London "Cosmocord" De Luxe Crystal Pick-up, with incorporated Dual Control, 48/6. Usual Price, 75/-. Write for Full Lists.

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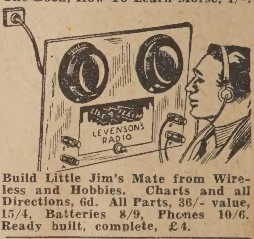

Build Little Jim's Mate from Wireless and Hobbies. Charts and all Directions, 6d. All Parts, 36/- value, 15/4, Batteries 8/9, Phones 10/6. Ready built, complete, £4.

Wate's 4 in 1 Pocket Meter. Reads 0 to 6, 0 to 15, 0 to 180 volts, 0 to 30 ml amps.

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ANSWERS TO CORRESPONDENTS

MAGIC

Norman H. (Kensington, Vic.): Thanks for letter. The tricks you mention are good opening tricks. Congratulations on performance. Photographs very nice. Will publish probably next issue. Write again. Will answer other questions by letter.

Trevor Jackson (Wellington, N.Z.): Ventriloquism instructions received will return soon. Seems very good to me. You would find ventriloquism easier if you used a doll; they are not very expensive. Will send you a list.

Jack Radford: Very interesting letter. Will forward written reply about the various tricks you mention. Send me a copy of the patter you speak about for the different tricks. Have you a photograph we could use? I can see you are a widely-read magician, congratulations. Write again.

A.J.F. (Windsor, S.A.): Glad you liked book, also glad you like the magic page of "Hobbies." Will send you a few more bigger tricks. Much practice is necessary for the sleight-of-hand moves you mention. Name of suitable book posted to you.

Norman G. (Lindfield): Ventriloquism is not difficult to learn. Have sent you the names of several books on the subject. Water bowls cost about 6/6. The Rope Trick is a good one and costs 3/6 at most magical dealers.

"Jock" (Scottish Magician, Nevertire): Scottish tricks could be made up or adapted from other existing experiments. Any of the standard effects advertised in catalogues could be presented as Scottish items by suitable dressing, and the use of Scottish patter.

Ted D. (Concord): Thanks for the interesting programme you sent. You have a well-balanced programme, but I think your opening trick could be improved—it is a little too long-drawn-out for an opening trick. Try the 20th Century Linked Silks.

Heather Jaques (Rose Bay): Yes, thanks. Always glad to hear from young lady magicians. Send a photograph in to me if you have one. Handkerchief tricks should be most suitable for you, also tricks with thimbles. Thimble tricks usually need a knowledge of sleight-of-hand, and a fair amount of practice would be necessary.

Joyce (Hurstville): Ventriloquism is your hobby, too? Congratulations. Have posted name and address of good teacher if you want personal lessons. Yes, the "Ventrilo" is a useful little instrument and is worth the small amount paid for it.

"Mysto" (Redfern, N.S.W.): Have written you. Give me a telephone call after you have considered what I have said. There have been several magicians to use the name of "Mysto." The illusion would cost about £15 to make, and would require at least two crates for packing and travelling.

Percy Henderson (Quilpie): Photographs received. Thanks. May publish later on. "Nicola" will no doubt visit Queensland before long. I have written him asking this and other questions for you. Write again.

D. Gilmore (Geelong, Vic.): List of suitable books sent. Tricks from America are usually dear to purchase, but are very well made. Australian-made apparatus, if purchased from the best manufacturers, is as good as I have seen. Magic catalogues from American magical dealers are usually charged for—some of them have over 300 pages in them. Tricks range from about 6d to £300 each. Write again.

RADIO

L.W. (Yass River).—As we have never made the attempt to rewind the generator in question, we would only be guessing if we tried to advise you, particularly as you are working from instructions which one would reasonably conclude were accurate. Most journals satisfy themselves that their information is authentic before publishing the same. Are you sure you are working from the right wire table? There are two, you know—S.W.G. and B. & S. However, we don't think the difference in gauge would make all that difference to results. Afraid you will just have to experiment for best results. We never like making statements about ideas we haven't tried out ourselves.

T.R.O'S. (Bundaberg).—Frankly, we would not care to advise you on building the set for the D.C. mains without very careful consideration. You could still use the back bias method, and a permagnetic speaker. It would be much easier to rebuild the gang condenser by removing plates from the rotor, than by using fixed condensers in series with each section. Instructions are given in this issue for rebuilding a standard gang condenser. However, if you want to cover the broadcast band as well, your idea would probably work quite well, although we don't altogether favor it. The series condensers would need to be accurate, and of high quality.

T.W.J. (Windsor) wants to know whether we will be publishing another Call-sign Book this year.

A.—We have been thinking about another call-sign book, but have not decided which would be the best way to issue it. We would welcome suggestions from our readers on this idea. Would you like another book, and, if so, what form and size should it take? We have some of last year's books still available at 1/- from our office, if anyone would like one. A good deal of technical information is also contained in this call-book.

S.H.D. (Bluff Point).—Sorry we can't reply by post. The coil for your set would be aerial 5 turns, grid 7 turns, reaction 8 turns. Use wire about 26 gauge, not critical, and space the windings ¼in. apart.

J.F. (Elwood).—Your reasoning would be right except for one or two things. In the first place, the 40 mill. rating is a nominal one, and the transformer does not appear to get unduly warm with this, or a slightly higher load. Secondly, the figures for the 6K8G and the 6F7 are for no signal conditions, with the A.V.C. out of action. When receiving a station, the current drain of the pentode stages would be much less than the figures you have given. Also, although the nominal rating for the transformer is 385 volts, we discovered later on that these had been amended to 325 volts. Naturally, with the lower voltage, the current drain, and the bias, will be reduced. You can rest assured that as described the set works quite satisfactorily, and the original has been in constant use ever since it was built. Any of the standard Magic Eyes would suit the circuit.

Readers are invited to send questions on Radio or Hobbies, for reply through these columns. Don't make your questions too long, or too complicated. Remember space is limited, and we can't explain "What is Radio?" in two inches of type. Replies will appear in the first available issue. Interesting subjects, too involved to be handled here, will be accepted as suggestions for articles elsewhere in the paper.

H.I. (Singleton): There is nothing in your letter to indicate why the tuning should have altered as you say it does. A change in tuning is almost certainly due to a change in capacity or a change in inductance. Turns of wire may have slipped out of place, or possibly the grid condenser is not of the best. It would be impossible to be more definite without actually seeing the set. Your A.C. circuit in general is correct, but better filtering would be needed for satisfactory results. Unfortunately, we have no suitable circuits to which we could refer you.

F.T.H. (Cootamundra): No, you would probably need a more selective receiver in Goulburn. The T.R.F. set may not be suitable in this locality. The later set uses a form of detection more generally satisfactory than that used in the earlier circuit. It is also much simpler to get going. It is interesting to hear of your early efforts with speakers and speaker systems and simply proves that there is nothing new under the sun!

O.G.D. (Rowena) asks for advice on designing some special relays, wants a written reply, and return of diagrams.

A.: Sorry, but we cannot spare the time to work out all that for nothing. We only have a few minutes to spare for each query from our readers, otherwise we would never get through them. We have often stated that such special designs, particularly when they require special letters, are quite outside the scope o our information service. Otherwise, we woul have to maintain a special design departmen just for the fun of it.

General: Mr. Ronald Clark, 1 Short-stree Mayfield East, has about 60 back numbers o "Wireless Weekly," including technical article which he will be pleased to make availabl to any of our readers who would like them We suggest you send postage when writing t Mr. Clark.

N.W.W. (Rugby) wants to know how to lin up the Portable set.

A.: You proceed just as with any other receiver. The padding condenser is unscrewe about three turns, and a signal at the botto of the dial tuned in. You can adjust the aeria trimmer to make it louder, if required. No adjust the oscillator trimmer until this statio is received at the right spot on the dia and line the aerial trimmer until you ge the loudest signal. Swing now to the to end of the dial, and tune in a station. Adjus the padder until it is received at best strengt retuning the gang each time you adjust th padder. Now go back to the centre of th dial, and reline the aerial trimmer, if necessar Having made sure all these adjustments a correct, you can adjust the intermediate trimmers for best volume, taking care first to mar the original position of each.

R.T. (Millicent): Write to Mr. A. H. Barne c/o of "Radio and Hobbies," and we wi send your letter on to him. He will answe any questions you have to ask.

J.M. (West Wyalong): See answer above.

C.J.S. (Cronulla): We published the articl exactly for people like you who are still interested in the future of direct coupling, without any expression of opinion one way or th other. Personally, at the moment we are n intending to start up the direct coupling argument, as there seems to be no justification fo it. Other methods easier to get going see to be more acceptable taking it all roun However, thanks for your letter and appreciative remarks.

S.H.D. (Bellevue Hill): Why the amazin mixture of valves? Are you trying to give u a headache? We haven't used the 6E5 tha way, so can't comment on it. The 6F7 migh operate all right, but again haven't tried i Doubt whether you would get enough for th 45's in class AB—have you looked up the driving requirements? Your connection for th two input valves looks wrong to us—why th two grid resistors in parallel? Suggest yo write to the A.W. Valve Co. and ask the for a copy of "Radiotronics," which dealt wit input mixing systems. It is hopeless tryin to explain all the things to be considered i these columns.

K.J.C. (Malvern): Condensers of 15 mmfds would do for all tuners. The oscillator ha in addition a variable or fixed condenser o 100 mmfds. connected permanently across i The variable controlled from the front pane is there as a vernier bandsetter. Thanks fo your very nice remarks about our paper.

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J.R.C. (Penshurst): Thanks for your sug-estions, which we will consider.

D.F. (Canterbury): The best way to work ut the 10-metre coils is to wind a set with bout two-thirds the turns for the 20-metre et, and then reduce the secondaries bit by it until you get there. It is very hard to ive exact figure, particularly as we don't remember winding a set for 10 metres. You hould be able to do it, however, with a bit f juggling with turns. We suggest that you se smaller formers, if you want to get the est efficiency—about half-inch. Naturally, you ill need more turns to get the required inductance.

S.B.R. (Rose Bay): The trimming condensers re 15 mfds. The oscillator condenser is variable, but it is not varied. An accurate fixed ondenser would do here just as well. The A6 could be used in place of the 6C8G, but ou would have to use grid leak detection, and plate feed-back oscillator coil, as the 6A6 as only one cathode. The output valve used this set requires a bias resistor of only 150 hms. The 400 ohms resistor would be used r a valve such as the 42, or the 6F6. Thanks r your very nice remarks about our paper.

R.G.Q. (Blackwood): You cannot use a set nder your household licence if it is not operated in the house. There is nothing to prevent you making and selling radio sets, as ong as you attach the required licence plate o each chassis. We would be quite interested n an article, with photographs, of the lathe. We could not enter into a discussion here of he "long line" theory. The range of the ransmitter would only be a few miles, but ould depend a good deal on the geographical onditions between receiver and transmitter.

T.R.M. (Brisbane): We can't say what the haracteristics of the valve would be as a riode, never having worked one that way. fraid you will have to work that out for ourself, although the makers might be able give you some hints. The 6A3 is just the ame as the 2A3, but the filament requires .3 volts instead of 2.5 volts. The idea of hielding the grid leak and condenser is a ood one, and we have found ourselves that uch a practice is sometimes desirable. This often the case in short-wave receivers, and e advise anyone who is troubled with hum nd harsh reaction on sets using a leaky grid etector to give the idea a trial. Incidentally, he extra grid in the 6A3 got there by a mistake! Don't wake it up. Thanks for your ice letter, which was much appreciated.

W.G.S. (Albury): You are asking for two hings which don't go together, when you want ighest selectivity with good tone. The average eceiver which is also very selective must cause certain drop in the high notes. Under the ircumstances, if you have a 1933 Standard ith 175kc. coils, you should have as much electivity as you are likely to get from any et. Don't forget that many stations on the ower end of the dial are working on the ame frequency, and separation is therefore mpossible. It is doubtful whether you could uild a set which would separate all the hannels down in that region without any nterference, no matter what set you built.

World's News

ALL NEWSAGENTS.

2d

J.G. (Caddington): It is quite all right to use plug-in coils with the circuit of Little Jim's Mate. Only to-day we had a etter from a reader who has done just this, with excellent results. The coils would be similar to those used in the Duplex Single. Sorry, but we can't supply circuits to order. If you write to us, giving a list of back numbers you require, plus the cost of the issues and postage, we may be able to find you some. It is hard to estimate the cost, because back numbers, due to the need for filing, etc., cost more as they get older. We can let you have a copy of the Call-Sign book on receipt of 1/- in stamps. We went into the matter of the gramophone oscillators,, but, for one thing, it is almost impossible to guarantee no interference with other sets. This is necessary in order to satisfy the Radio Inspector.

W.J.M. (French's Creek) writes very enthusiastically about the Stereoscopic Seven, which he says he wouldn't change for any set he has heard. It is his first big set, but he was able to get it going from the instructions and diagrams, without any trouble. Thanks for your very nice letter, and we wish you every success with your set. We doubt whether a big battery short waver would be built by very many—we would like to hear from readers interested in a large battery set for short waves only.

S.S. (Eastwood): We would be interested to know of the connection you mention, although frankly, we don't think it could be anything which has not been used before. If you would care to let us into the secret, we will be glad to hear all about it.

C.H.S. (Tamworth) wants to build a small battery receiver for use in the car and out doors.
A: In the June issue of "Radio and Hobbies," we published details of an excellent portable receiver which should be just what you require. You could make it fit a smaller cabinet by using a smaller speaker, and smaller batteries, but its tone would suffer, also it would not last nearly as long on one set of batteries. The original has proved itself a great job for just the work you require. The issue mentioned, copies of which are still obtainable at our office, contained full instructions for building.

"Car Radio Enthusiast" (Ballina): Yes, we are still thinking of the car radio, but so far, as it is likely to entail a good deal of work, have not got very much further forward with it. Still, it isn't forgotten. Twelve volt vibrators are available, if ordered through your radio dealer.

M.M.S. (Cootamundra): We have never described in full, the construction of such an oscillograph, mainly because few of our readers would require to built it. We published details some time ago, of a simple job mainly of use to amateur transmitters, but this would not be of much use to you. It isn't altogether an easy job, and the manufactured ones are quite reasonable, and should give you good service.

H.L.S. (Stockton) reports that he has built the Little Jim circuit, using plug-in coils for short-waves, and has received more short-wave stations than he was able to write down. On the broadcast band, at one time or another, he has received 88 stations, 54 of which were useful for programmes. This includes three New Zealanders. Not a bad effort, H.L.S.! It is only to be expected that selectivity would be poor when local stations are operating. The one you are doubtful of sounds very like a New Zealander. The use of 4 volts would not materially effect selectivity, and as the emission required from the valve is very low, we doubt whether you notice any difference using the full 6.3 volts.

H.K.D. (Currency Creek): Multiply the number of plates less 1 by the dielectric constant (air equals 1) by the area of plate overlaps in sq. cms. by .885, and divide the lot by the distance between the plates in cms. This is the maximum capacity. It would be impossible to suggest a circuit for your valves without knowing the exact type numbers, also whether the amplifier would be for battery or A.C. operation. No one article could cover all these points without being as long as from here to there.

J.A.A. (Rockhampton): Your easiest way out would be to obtain one of the old type Philips power supplies, which give about 150 volts at 30 mills. You could buy one of these for less than the power supply would cost you, and it would be much more suitable than the diagram you submit. Why not write to Price's Radio? They often have these units pass through their hands in good order.

F.W. (Newcastle): It is some time since we described a converter for use with a broadcast set, and, although one or two of them were very successful, it is doubtful now whether you would be able to get a back number. Sorry, but we couldn't undertake to work one out for your special benefit, and nowadays, there isn't much demand for converters.

"Radio Magician" (Wellington): Many thanks for your letter, and the circuit it contained. We are delighted to know that you picked up our magazine, and found yourself reading it from cover to cover. That's the way it ought to be. We will have a look through your circuit, and may be able to print it for the benefit of our readers who may be interested.

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